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**TERRESTRIAL FAUNA FROM CAVITIES IN NORTHERN
AND CENTRAL SLOVENIA, AND A REVIEW OF
SYSTEMATICALLY ECOLOGICALLY INVESTIGATED
CAVITIES**

**KOPENSKA FAVNA VOTLIN SEVERNE IN OSREDNJE
SLOVENIJE TER PREGLED SISTEMATIČNO EKOLOŠKO
RAZISKANIH VOTLIN**

TONE NOVAK¹

In memory of Jože Bole, Jovan Hadži, Zora Karaman, Zachiu Matic, Narcis Mršić, Josef Nosek, Anton Polenec, Egon Pretner, Karl Strasser, and Pětr Us.

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Abstract

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Tone Novak: Terrestrial Fauna from Cavities in Northern and Central Slovenia, and a review of systematically ecologically investigated cavities

In the years 1977-2001, the fauna and ecological conditions in 55 cavities – caves and artificial tunnels – in northern and central Slovenia were systematically investigated. Zoogeographically, this is the meeting point of the Alpine, Pannonian and Dinaric biome. This article lists 321 terrestrial genera, 456 species and 100 subspecies belonging to 183 families, that had been recorded by 2005 in cavities of this region in the course of our own investigations, and that have been cited in the references. This taxonomical review serves as a foundation for understanding ecological and other treatise on the terrestrial fauna in the hypogean habitats of northern and central Slovenia, those that have been published ones, as well as those in preparation. The overview of the systematically investigated cavities, and the review of the methods and techniques used has been added to provide general information about the morphology of these caves, and the ecological research within them.

Key words: artificial tunnels, bibliographic review, caves, cavities, ecological research, faunal review, northern and central Slovenia, terrestrial fauna.

Izveček

UDK: 591.521(497.4):574.4

Tone Novak: Kopenska favna votlin severne in osrednje Slovenije ter pregled sistematično ekološko raziskanih votlin

V letih 1977-2001 smo sistematsko raziskovali kopensko favno in ekološke razmere v 55 votlinah – jamah in izkopanih rovih – severne in osrednje Slovenije. Zoogeografsko je to ozemlje na stičišču alpskega, panonskega in deloma dinarskega bioma. V članku je pregled 321 rodov, 456 vrst in 100 podvrst živali iz 183 družin, ki so bile do leta 2005 najdene v votlinah tega območja med lastnimi raziskavami ter po podatkih iz citirane literature. Taksonomski pregled je osnova in opora za razumevanje ekoloških ter drugih razprav o kopenski favni v podzemeljskih habitatih severne in osrednje Slovenije, ki so že objavljene in ki jih pripravljamo. V nadaljevanju so predstavljene votline, v katerih so potekale sistematske ekološke raziskave, ter našete uporabljene metode in tehnike, s čimer je omogočen vpogled v morfologijo ekološko raziskanih votlin ter metode raziskovanja.

Ključne besede: bibliografski pregled, ekološke raziskave, favnistični pregled, jame, kopensko živalstvo, izkopani rovi, votline, severna in osrednja Slovenija.

INTRODUCTION

In 1977, systematic ecological investigation of caves and artificial tunnels started in Slovenia (Novak & Kuštor, 1977). Between the years 1977 and 2001, investigations were carried out in 55 caves and artificial tunnels of northern and central Slovenia (the UTM codes UM, VM and WM). This area shares parts of the Alpine, Pannonian and Dinaric biomes. By 1988 (Novak, 1988, 1989), 312 genera, 422 species and 23 subspecies of terrestrial taxa found in these and other cavities in the region had been recorded. Since then, further taxa have been found in cavities within the region, and some new ones have been described, therefore a complete list is now required. At the same time, this faunistic review provides the basic information for ecological considerations relevant to these 55 cavities. The ecological findings have partly been published (Novak et al. 1996, 2004a,b). To enable better understanding of these papers as well those in preparation, diagrams of these cavities – in the case of longer cavities, only of those parts under the investigation – are presented here to show their morphology, and the types of data collected are cited in summary to provide an introduction to the ecological sampling used.

The objectives of this paper are to present

- a complete list of the terrestrial taxa found in cavities of northern and central Slovenia up to 2005,
- to present the morphology of and the ecological methodology used within the cavities being investigated,
- and to provide a bibliographic review of papers, related to the terrestrial fauna in cavities of northern and central Slovenia.

MATERIAL AND METHODS

The following 55 caves and artificial tunnels in northern and central Slovenia were subject to systematic ecological investigation (Table 1; Figs. 1, 2–No. 1–54; Novak et al., 2004b: Fig. 1–No. 55). Besides general data about the cavity locality, two groups of ecological items were provided during the investigations (Fig. 3). The first group, called constant data, consists of relatively unchangeable cavity characteristics, which were provided only once. The second data group concerns seasonally changeable items, which were obtained on two visits per season made within 45–48 hours. The terrestrial fauna was recorded by systematic observations of the cavity walls, ceiling and floor, by baited pit-fall traps, and desiccation of ground material in Berlese funnels (Novak & Kuštor, 1977). Ecological parameters were measured mostly in accordance with the methods published by Stewart et al. (1974) and Rowell (1997). Details about the methods are presented in accordance with the research topics (e.g. Novak et al., 2004a). For each cavity, and the sampling site within, respectively, the data were typeset as follows.

General data

The Cadaster number of a cave (according to the Slovenian Speleological Society), or the fictive running number of an artificial tunnel, respectively; cavity name; UTM code; co-ordinates of the (main) entrance; altitude of the (main) entrance; azimuth of the (main) entrance; biome, in which the cavity occurs.

Constant data (one record in each cavity/ sampling section within a cavity)

The investigated, and the total known length of a cavity; number of entrances; geological type of rock with the cavity; vegetation type above the cavity; date (season) of investigations; polygonal distance of the sampling site from the (nearest) entrance; vertical distance of the sampling site from the surface; the size of the passage cross section; rock consistency and its surface morphology in the cavity; summary size of wall, ceiling and ground area; presence of wall and ceiling fissures and cracks; cavity origin, morphological, hydrological and ventilation type; illumination; length of the illuminated section of the cavity; floor description; weight loss on ignition (~ quantity of organic matter)

Seasonally changing data (four samplings; one each season)

Air temperature and relative humidity; ground temperature, hygidity, pH, carbonate content and colour; wind velocity; faunistic data including the sampling methodology

Most of the material collected from the cavities that were investigated is deposited in the Prirodoslovni muzej Slovenije (Slovene Museum of Natural History) in Ljubljana.

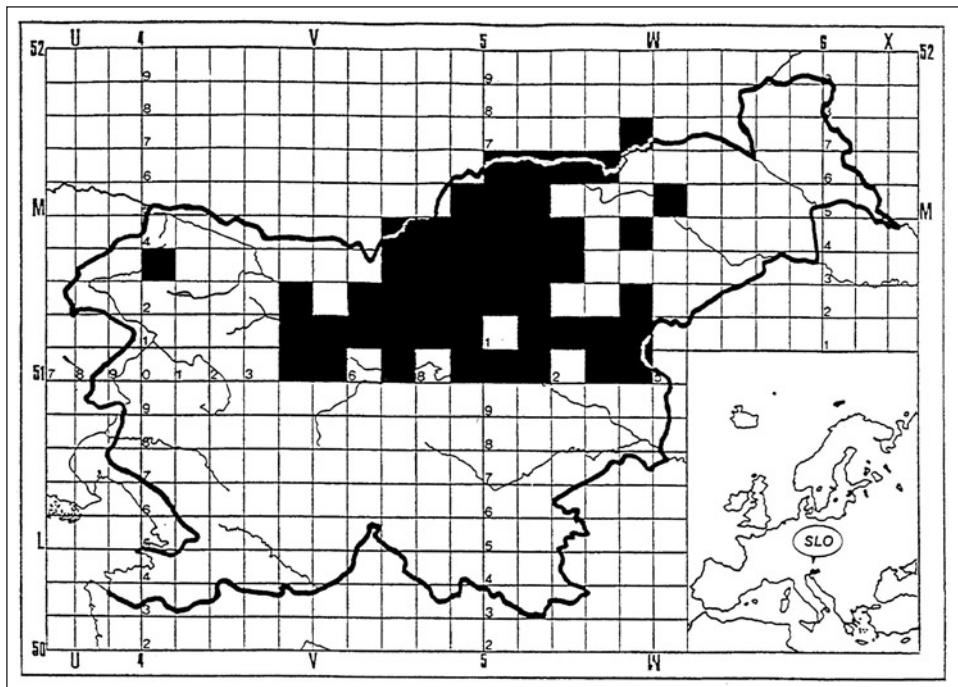


Figure 1: The area in the 10 x 10 km UTM grid, where the cavities were subject to systematical ecological investigation in the years 1977-2001.

Slika 1: Območje v UTM mreži 10 x 10 km s sistematsko ekološko raziskanimi votlinami v letih 1977-2001.

No.	Name	Cad. No.	UTM	X	Y	altitude
1	Ivačičeva jama	2399	VM03	5411950	5137610	2435
2	Jama pri taboru	367	VM42	5441880	5126050	460
3	Štinetova jama	240	VM41	5446720	5116120	395
4	Godova jama	3462	VM40	5442180	5104550	520
5	Babja luknja	35	VM51	5453370	5110310	330
6	Jama 2 na Jurcetovih Percah	2327	VM50	5455390	5106460	408
7	Urhova jama	505	VM62	5462620	5124250	465
8	Lisičja luknja	401	VM61	5462400	5110670	530
9	Zijalka nasproti Ribče peči	4605	VM74	5471470	5141700	820
10	Rački pekel	465	VM73	5478540	5138520	590
11	Zijalka v Dovji Griči	376	VM72	5474640	5129020	1515
12	Boštonova jama	757	VM71	5475650	5110370	330
13	Ihanšica	46	VM70	5472850	5108450	390
14	Korančevka	2503	VM84	5483610	5148230	1010
15	Zamernikova jama	B2	VM83	5485180	5138324	860
16	Podkrajnikova zijalka	2697	VM82	5483575	5125210	820
17	Lovrišnikova jama	758	VM81	5485060	5111700	480
18	Jama pri Votli peči	3263	VM95	5498160	5155920	400
19	Skobirjeva votlica	3956	VM94	5498450	5146460	940
20	Mozirska jama na Golteh	563	VM93	5492780	5136120	1250
21	Krapljetova jama	484	VM92	5497180	5126780	850
22	Jama v Lipovici	1182	VM91	5491950	5112800	510
23	Brdajsava jama	3497	VM90	5492335	5108125	651
24	Umetni rov v Dravogradu	U1	WM06	5501931	5159942	350
25	Objekt pri Žnodru	B1	WM05	5504332	5151680	550
26	Rdečka jama	3488	WM04	5504790	5144860	858
27	Lokoviška jama	3959	WM03	5501500	5135550	400
28	Tanjškova jama 2	4194	WM02	5506400	5129600	347
29	Jama v Burgi	1091	WM00	5503780	5103780	600
30	Umetni rov v Bistriškem grabnu	U2	WM16	5510125	5166905	480
31	Zapečke peči	3208	WM15	5517200	5155870	610
32	Jama Školjka	3311	WM14	5513720	5141040	552
33	Zgornja Steska jama	169	WM13	5512550	5129850	365
34	Špegličeva jama	3512	WM12	5515350	5128375	400
35	Ocvirkova jama v Štadlerjevem gozdu	5348	WM11	5514400	5118200	320
36	Kapelarjevo brezno	4706	WM10	5515700	5107360	640
37	Jama pod Herkovimi pečmi	1849	WM26	5520520	5164730	545
38	Jaklova luknja	4636	WM24	5521080	5148540	1000
39	Lindeška jama	2304	WM23	5525150	5134025	550
40	Fantovska luknja 2	3967	WM21	5523900	5117750	480
41	Umetni rov nad Šturmovo grabo	U3	WM36	5535231	5161610	600
42	Jama v kamnolomu pri Suhem	4632	WM31	5530790	5111210	500
43	Glija jama	84	WM30	5534200	5107450	515
44	Jama 2 v Repoluskovih pečinah	4371	WM47	5547450	5170800	480
45	Luknja pri Naceku na Planici	2407	WM44	5543800	5148000	730
46	Jama v kamnolomu nad Studenicami	252	WM42	5547750	5128300	400
47	Rov	U4	WM41	5545980	5112834	270
48	Gruška jama	1374	WM40	5544435	5105500	310
49	Jama pri Pruhu	4380	WM55	5555350	5153250	246
50	Pavlijeva luknja	3142	WM14	5517850	5164125	590
51	Ovčje peklo nad Radljami	3192	WM16	5518550	5164150	520
52	Pilanca	520	WM14	5513600	5141420	646
53	Jama pod južnim vrhom Tisnika	521	WM16	5513400	5141150	725
54	Huda luknja pri Radljah	3191	WM14	5517500	5163900	450
55	Železna jama	2678	VM71	5472450	5110275	340

Table 1: Cavities given a systematic ecological investigation in the years 1977–2001.

Tabela 1: Sistematično ekološko raziskane votline v letih 1977–2001.

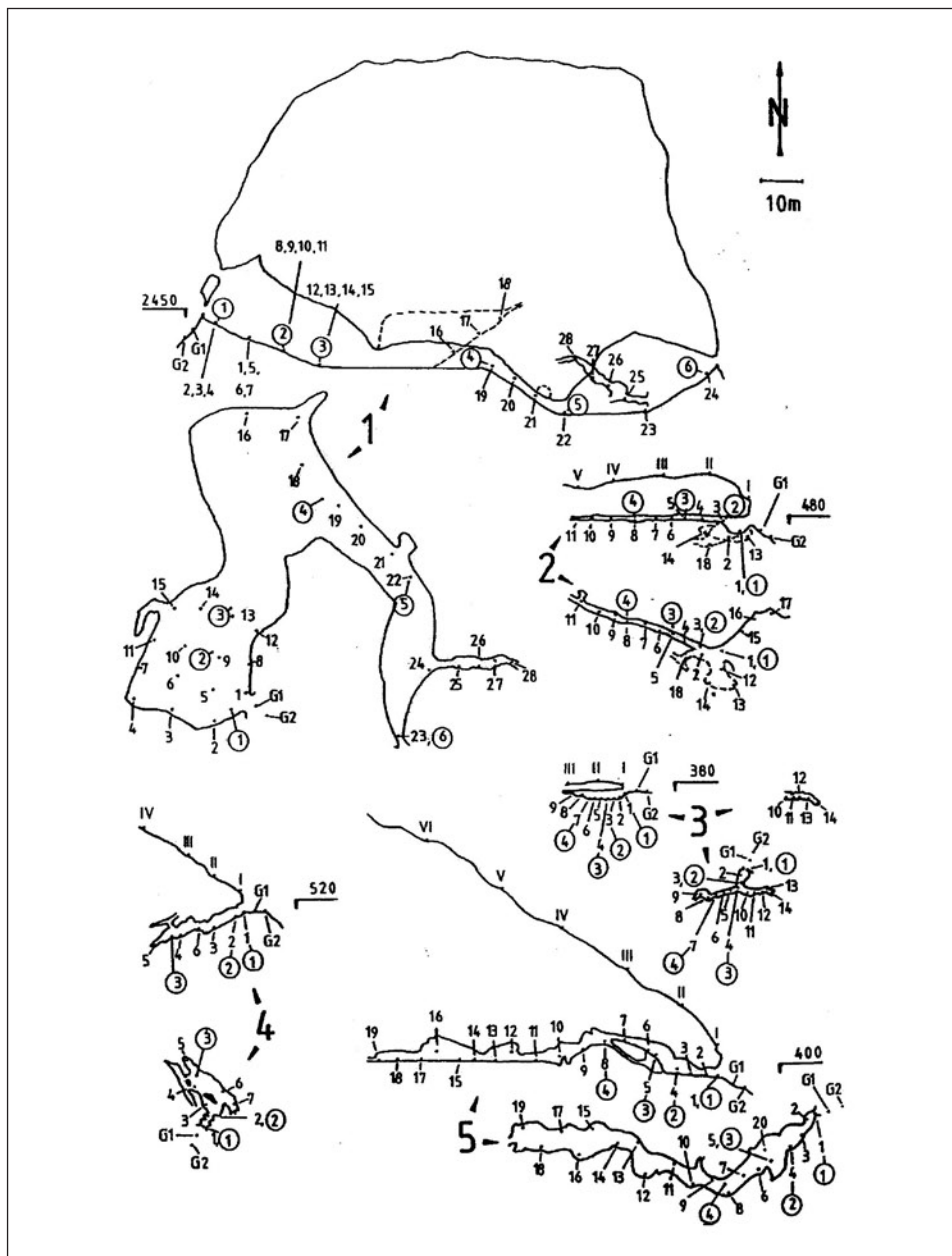
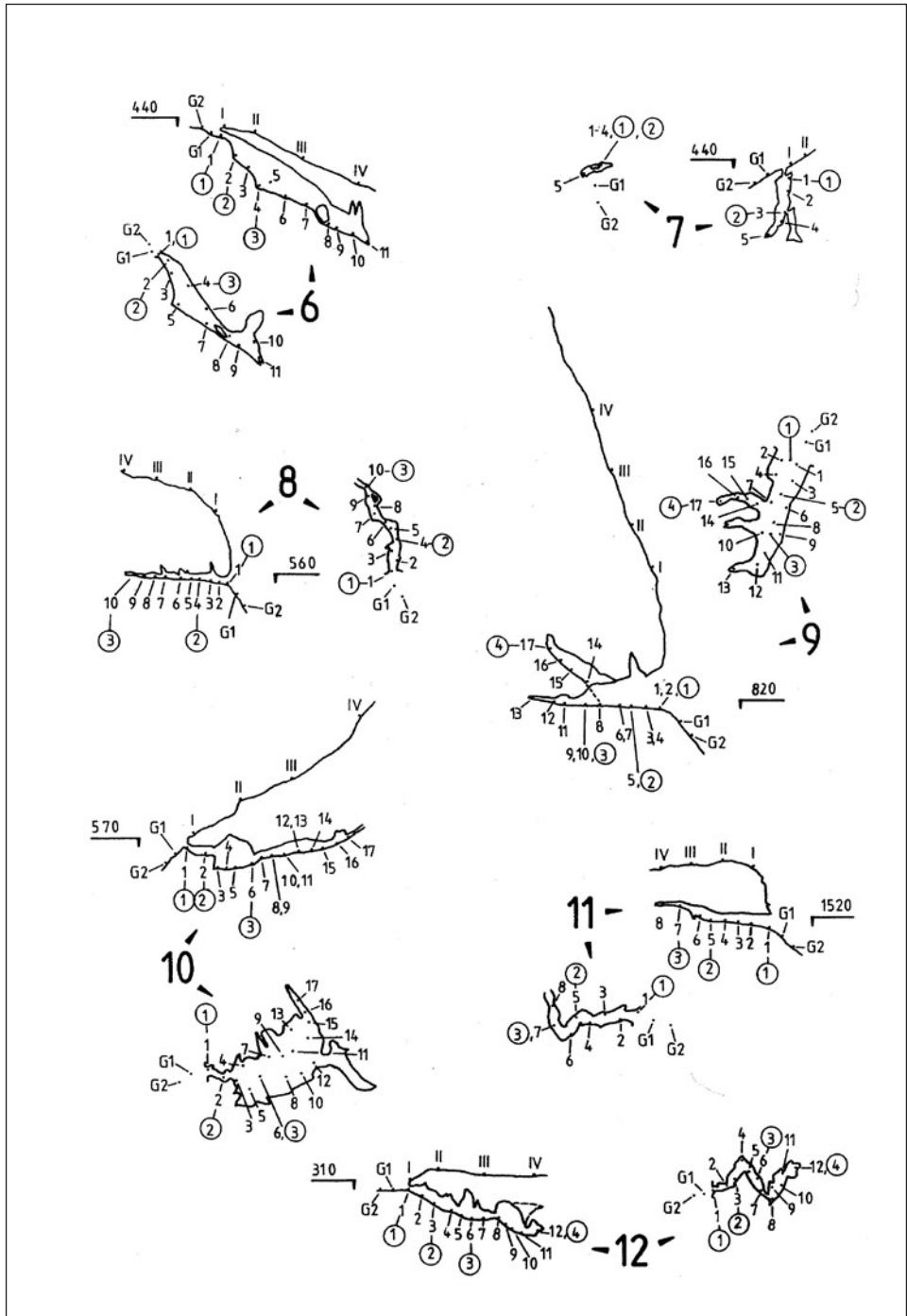
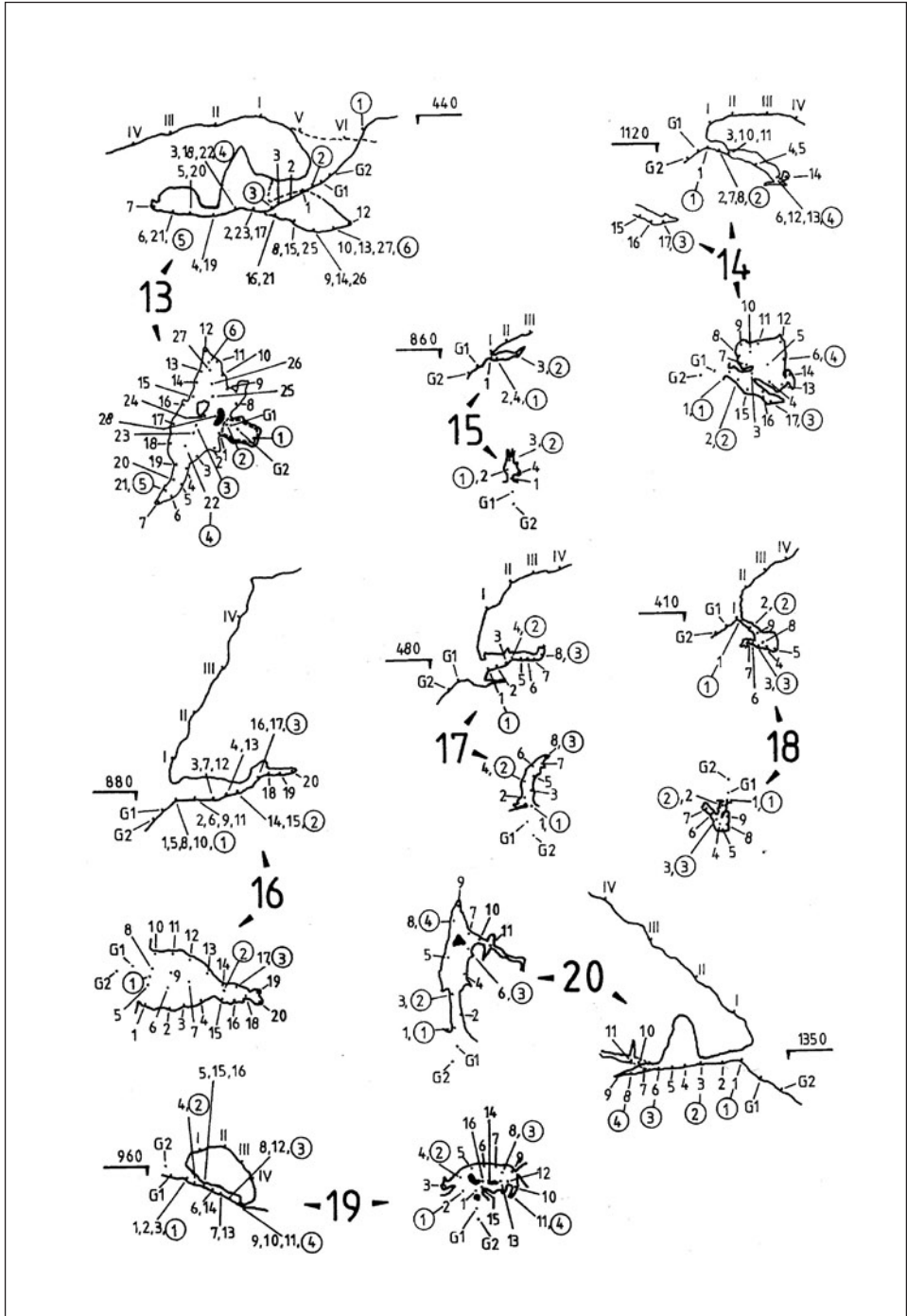
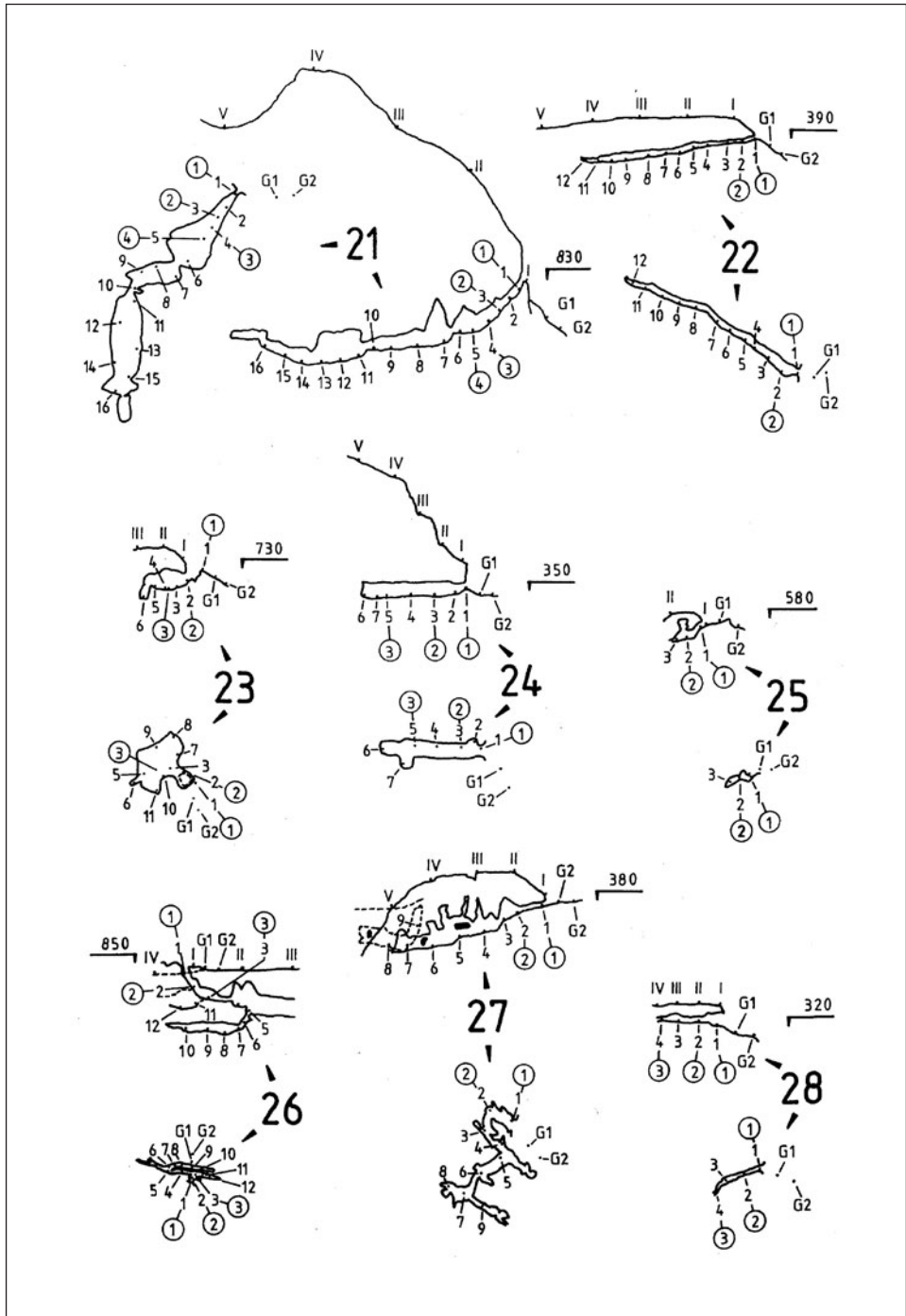


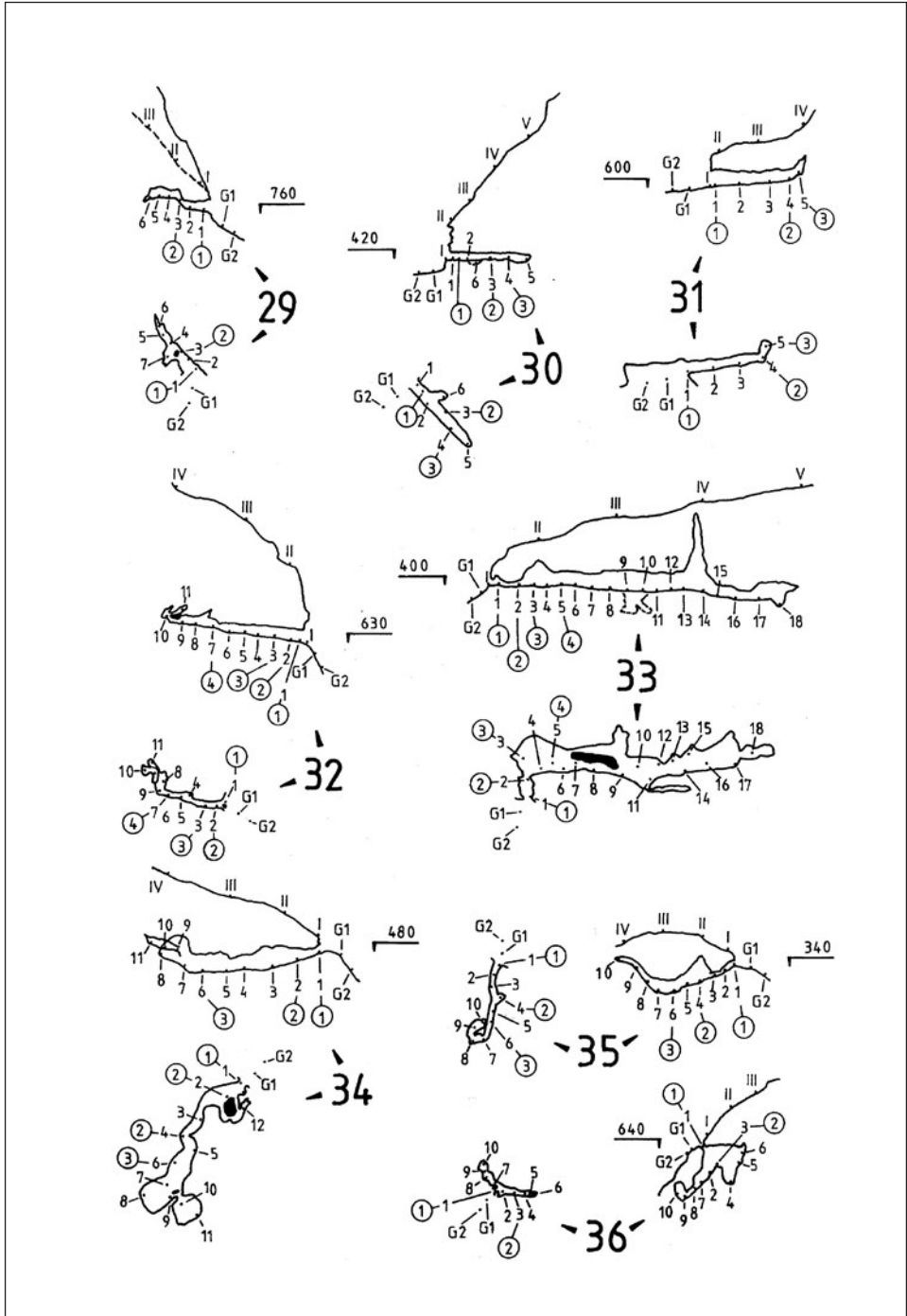
Figure 2: Survey of 54 cavities subject to systematical ecological investigation in the years 1977-2001 (for cave 55, see Novak et al., 2004b).

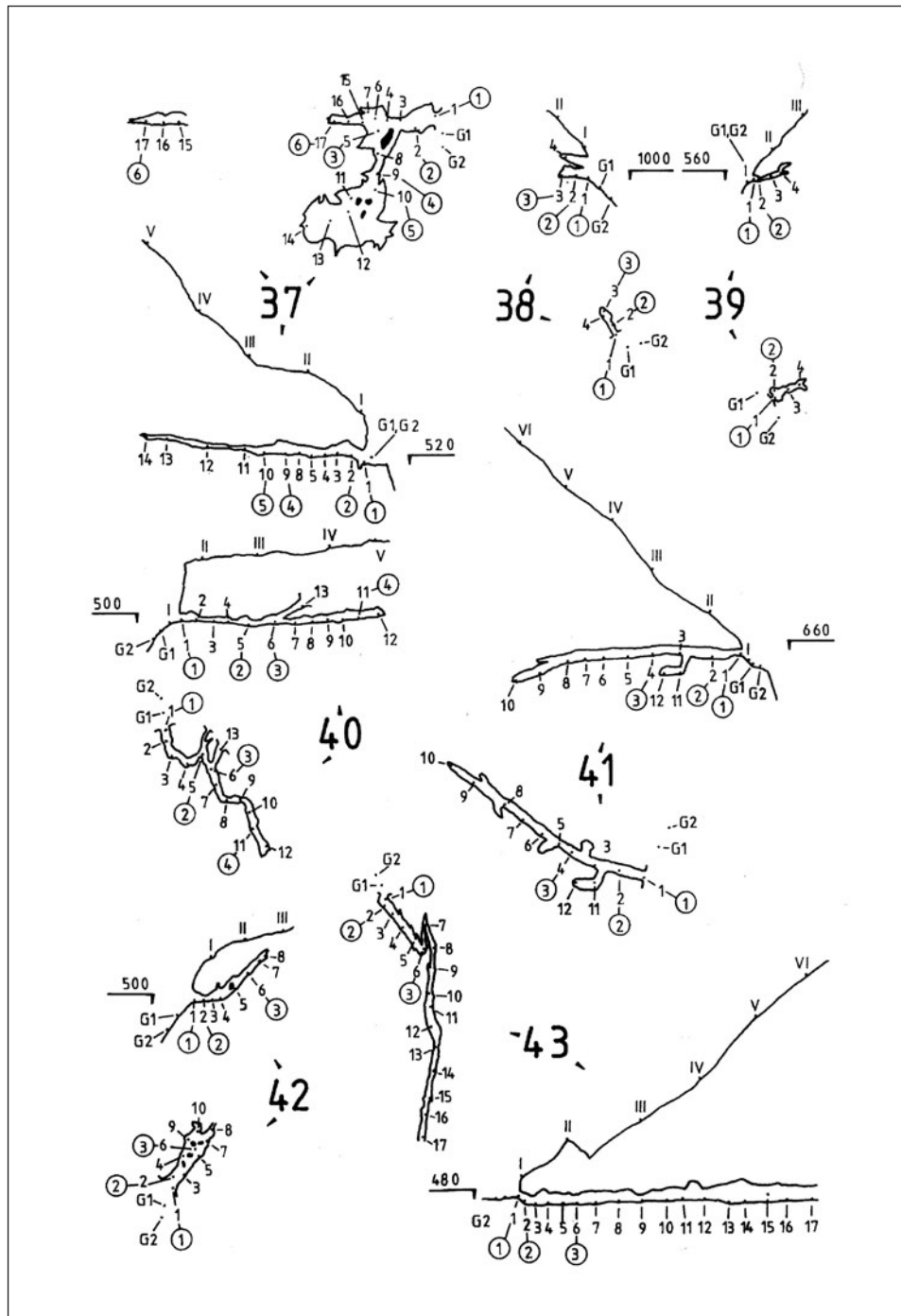
Slika 2: Pregled 54 votlin, sistematsko ekološko raziskanih v letih 1977-2001 (za jamo 55 glej Novak et al., 2004b).

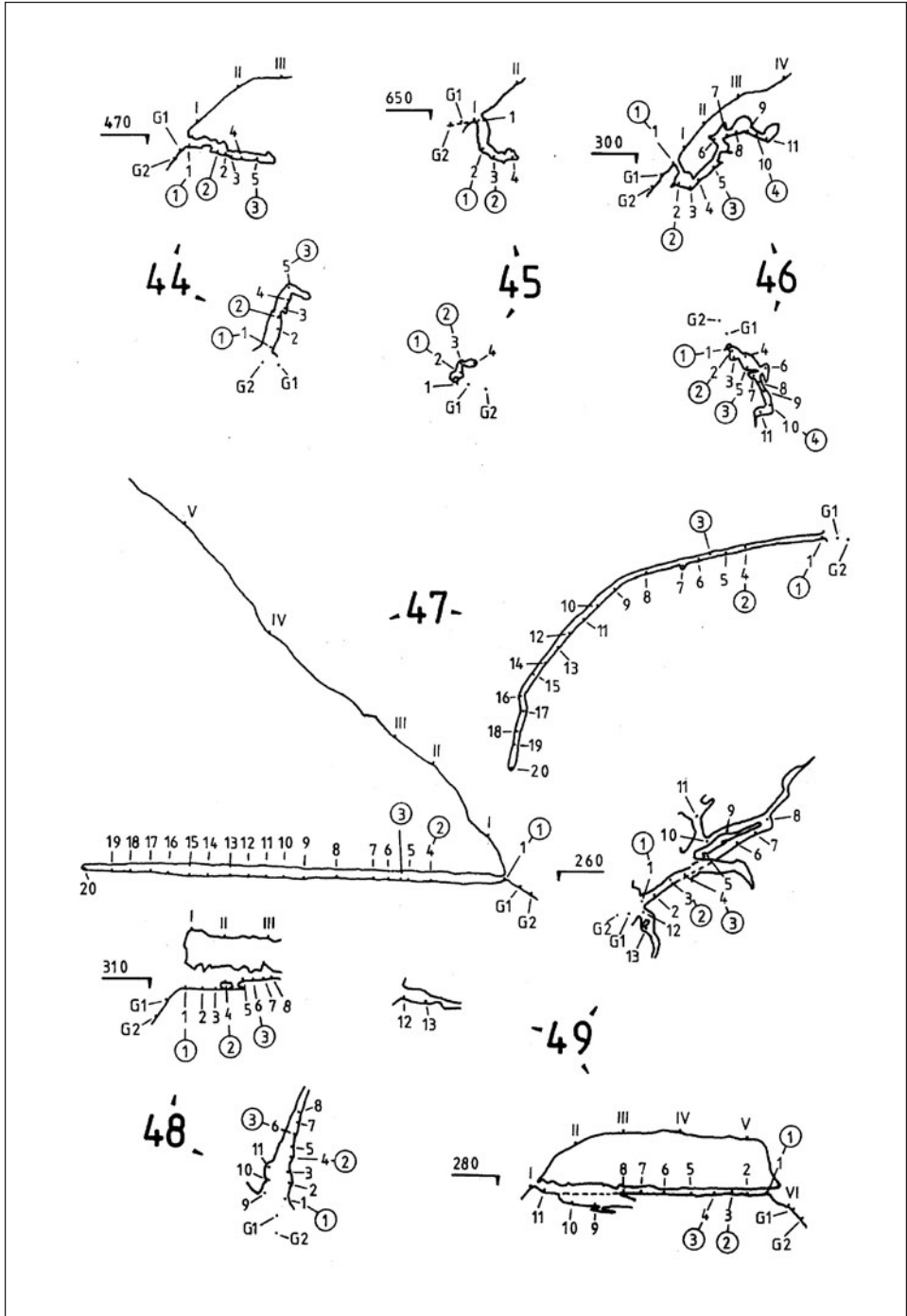


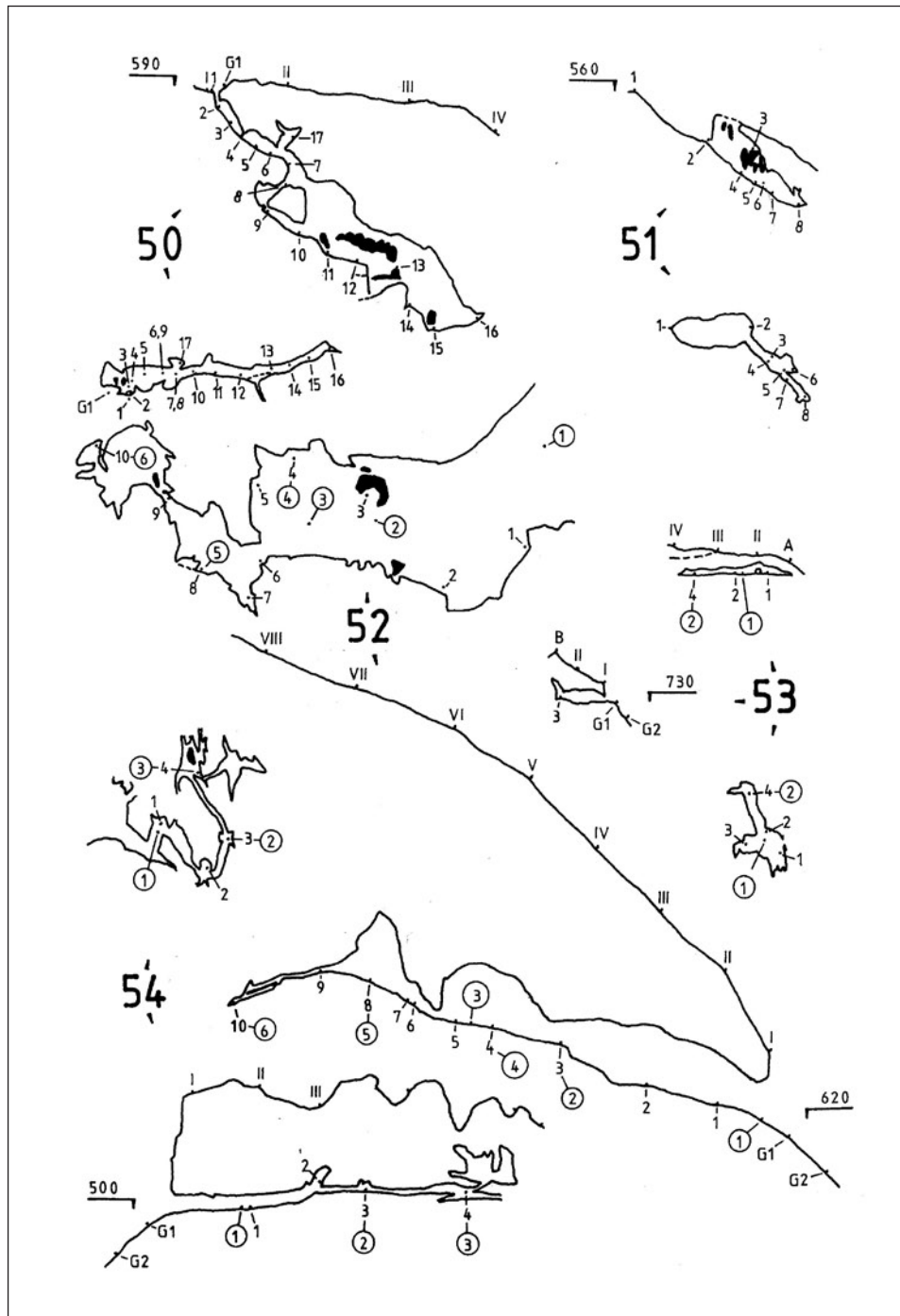












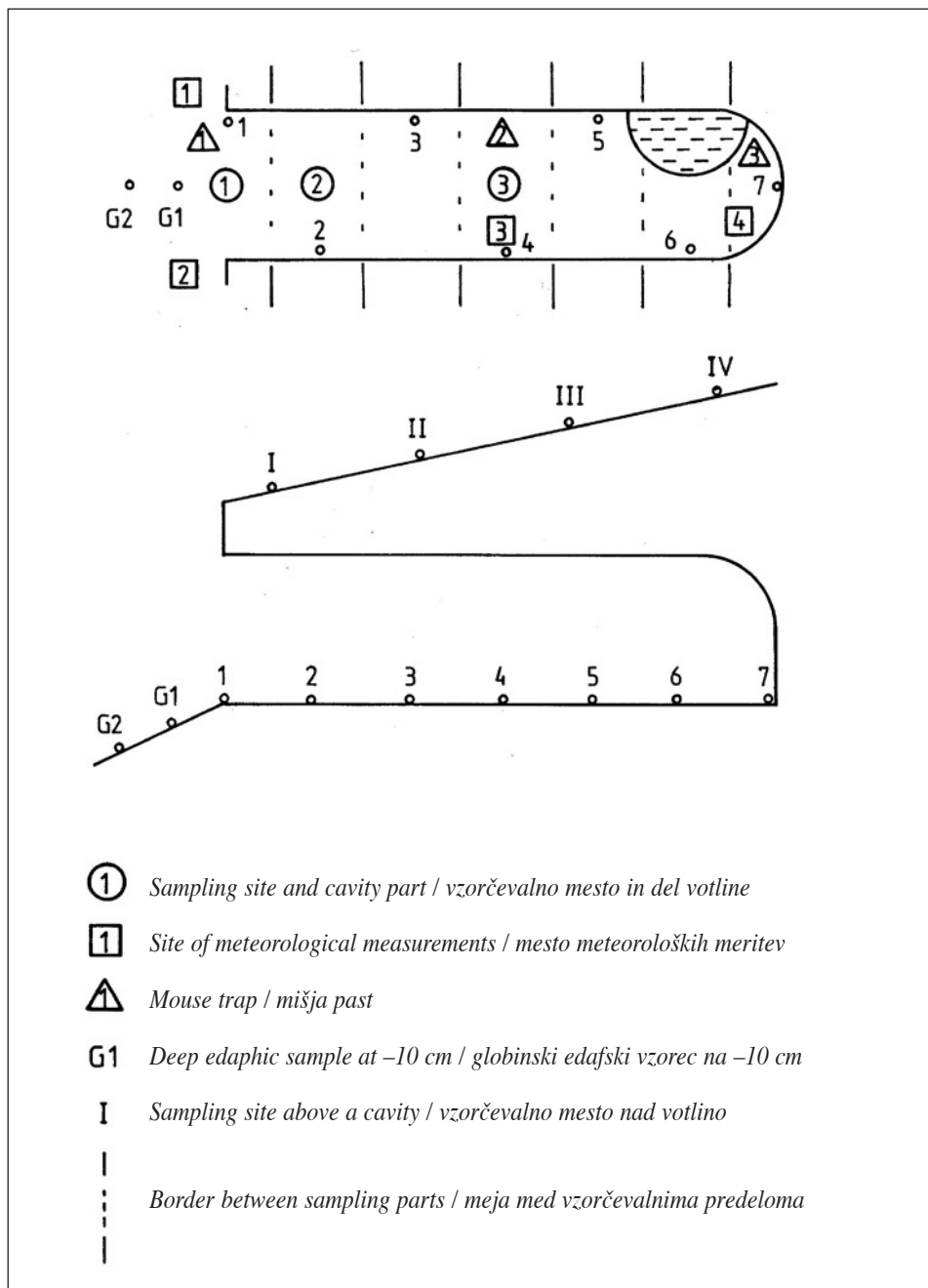


Figure 3: General review of ecological sampling in the cavitites.

Slika 3: Splošni pregled pridobivanja ekoloških podatkov v votlinah.

RESULTS

The complete checklist of the terrestrial fauna in cavities of northern and central Slovenia (UTM codes UM, VM and WM) represents both data obtained in the systematically investigated caves, as well as that from other caves in the region cited in the literature. In the following review (List 1), 456 species and 99 subspecies of terrestrial animals, belonging to 321 genera of 183 families, are cited.

List 1: Review of fauna recorded in cavities of northern and central Slovenia - UTM codes: UM, VM and WM - up to 2005 (T troglomorphic taxon, E endemite of Slovenia, c carbonates, n non-carbonates; the determinators of the own collection are added)

Seznam 1: Pregled favne votlin severne in osrednje Slovenije - UTM kvadrati UM, VM in WM - do leta 2005 (T troglomorfozni taksoni, E endemiti Slovenije, c karbonati, n nekarbonati; imenovani so določevalci lastne zbirke)

PROTOZOA not sampled

NEMATODA indet. c, n

GASTROPODA, alive only (VELKOVRH, F. & J. BOLE det.; lit.)

Cochlostomatidae

Cochlostoma s. septemspirale (RAZOUMOVSKY) c

Pomatiasidae

Pomatias elegans (O.F. MÜLLER) c

Aciculidae

Acicula stussineri (BÖTGER) T E c

Clausilidae

Charpentieria ornata (ROSSMÄSSLER) c

Cochlodina laminata MONTAGU c

Iphigena (Macrogastera) badia (C. PFEIFFER) c

I. plicatula (DRAPARNAUD) c

Ferussaciidae

Cecilioides acicula (O.F. MÜLLER) T c

Zonitidae

Aegopis verticillus (LAMARCK) c, n

Oxychilus (Riedelius) depressus (STERKI) n

Oxychilus sp. c

Arionidae

Arion sp.

Limacidae

Lehmannia marginata (O. F. MÜLLER) c

Limax cinereoniger WOLF c, n

L. maximus LINNAEUS c

Helicidae

Campylaea planospira illyrica (STABILE) c, n

Trichia (Edentiella) edentula (DRAPARNAUD) c

<i>Trichia</i> sp.			c
<i>Arianta arbustorum</i> (LINNAEUS)			c
<i>Helix pomatia</i> LINNAEUS			c
Carychiidae			
<i>Zospeum a. alpestre</i> FREYER	T	E	c
<i>Z. alpestre bolei</i> SLAPNIK	T	E	c
<i>Z. isselianum</i> (POLONERA)	T		c
<i>Z. amoenum</i> (FRAUENFELD)	T		c
<i>Z. f. frauenfeldi</i> FREYER	T	E	c
<i>Z. f. osolei</i> SLAPNIK	T	E	c
<i>Z. kusceri</i> (A. J. WAGNER)	T	E	c
<i>Z. lautum</i> (FRAUENFELD)	T	E	c
<i>Z. spelaeum costatum</i> (FREYER)	T	E	c
<i>Z. schmidti</i> (FRAUENFELD)	T	E	c
Pupillidae			
<i>Spelaeodiscus hauffeni</i> (F. SCHMIDT)	T	E	c
<i>Discus rotundatus</i> (O.F. MÜLLER)			n
Argnidae			
<i>Argna (Agardhiella) truncatula</i> (PFEIFFER)	T		c
Vitrinidae			
<i>Vitrea</i> sp.			c
OLIGOCHAETA			
Enchytraeidae indet.			c, n
Lumbricidae (MRŠIĆ, N. det.; lit.)			c
<i>Allolobophora smaragdina</i> ROSA			n
<i>Dendrobaena octoedra</i> (SAVIGNY)			c
<i>D. byblica</i> (ROSA)			c, n
<i>Eisenia lucens</i> (WAGA)			c, n
<i>E. spelaea</i> (ROSA)			c, n
<i>E. t. tetraedra</i> (SAVIGNY)			c
<i>Proctodrilus a. antipai</i> (MICHAELSEN)			c
<i>Pannoniona leoni</i> (MICHAELSEN)			c
<i>Dendrodrilus r. rubidus</i> (SAVIGNY)			c
<i>D. r. tenuis</i> (EISEN)			c
<i>Aporrectodea (A.) r. rosea</i> (SAVIGNY)			c
<i>A. (A.) smaragdina</i> (ROSA)			c
<i>Octolasion tyrtaeum</i> (ÖRLEY)			c
<i>Octodrilus transpadanus</i> ROSA			c
<i>O. meroandricus</i> MRŠIĆ			c
<i>Octodriloides camnensis</i> (BALDASERRONI)			c
<i>O. zupancici</i> MRŠIĆ		E	c
<i>Lumbricus castaneus</i> (SAVIGNY)			c
<i>L. rubellus</i> (HOFFMEISTER)			c
HIRUDIEA (SKET, B. det.)			
Diestecostomatidae			
<i>Xerobdella lecomptei</i> FRAUENFELD			c

ONISCOIDEA (POTOČNIK, F. det.)

Ligidiiidae

Ligidium germanicum VERHOEFF c, n

Trichoniscidae

Androniscus stygius dentatus STROUHAL T E c

A. (A.) subterraneus subterraneus STROUHAL T c

A. (A.) s. nodosus STROUHAL T E c, n

A. (Dentigeroniscus) d. dentiger VERHOEFF T E c, n

A. (Roseoniscus) roseus (C. L. KOCH) T c

Calconiscellus karawankianus VERHOEFF T c, n

Hyloniscus vividus (C. L. KOCH) c

Trichoniscus (T.) austriacus VERHOEFF n

T. (T.) stammeri VERHOEFF c

Porcelionidae

Porcelium f. fumanum VERHOEFF c

P. f. salisburgense VERHOEFF c

Protracheoniscus a. amoenus C. L. KOCH n

P. hernagorensis VERHOEFF c

Trachelipus r. ratzeburgi (BRANDT) c

T. razzauti razzauti ARCANGELI c

Cylisticidae

Cylisticus convexus (DE GEER) c

Armadillidiidae

Armadillidium vulgare LATREILLE

SCORPIONES (NOVAK, T. det.)

Chactidae

Euscorpius germanus (C. L. KOCH) c

PSEUDOSCORPIONES (HADŽI, J. det.; lit.)

Chthoniidae

Chthonius raridentatus HADŽI T E c

Neobisiidae (lit.)

Roncus brevimanus (JOSEPH) T E c

R. (Parablothrus) s. stussineri (SIMON) T E c

PALPIGRADA

Eukoeneiidae

Eukoenia sp. T c

ARANEAE (DEELEMAN-REINHOLD, C. & A. POLENEC det.; lit.)

Dysderidae

Dysdera sp. c

Harpactea lepida (C. L. KOCH) c

Harpactea sp. n. c

Segestria senoculata LINNAEUS c

Clubionidae

Anyphaena accentuata (WALCKENÄR) c

Clubiona pallidula CLERCK c

<i>C. subtilis</i> L. KOCH	c
<i>C. terrestris</i> WESTRING	c
<i>Liocranum rupicola</i> (WALCKENÄR)	c
<i>Scotina celans</i> (BLACKWALL)	c
Agelenidae	
<i>Cicurina cicurea</i> (FABRICIUS)	c
<i>Coelotes inermis</i> (L. KOCH)	c, n
<i>C. solitarius</i> L. KOCH	c
<i>Cybaeus angustiarum</i> L. KOCH	n
<i>C. tetricus</i> (C. L. KOCH)	c, n
<i>Histopona luxurians</i> (KULCZYNSKI)	c, n
<i>H. torpida</i> (C. L. KOCH)	c, n
<i>Tegenaria cf. ferruginea</i> (PANZER)	c
<i>T. parietina</i> (FOURCROY)	c
<i>T. silvestris</i> L. KOCH	c, n
<i>T. tridentina</i> L. KOCH	c
<i>Tetrilus macrophthalmus</i> (KULCZYNSKI)	c
<i>Tetrix</i> sp.	c
Nesticidae	
<i>Nesticus cellulanus</i> CLERCK	c, n
<i>N. idriacus</i> ROEWER	c
Theridiidae	
<i>Achaeearanea tepidariorum</i> (C. L. KOCH)	n
<i>Enoplognatha ovata</i> (CLERCK)	n
<i>Enoplognatha</i> sp.	c
<i>Theridion</i> sp.	c
Tetragnathidae	
<i>Meta menardi</i> LATREILLE	c, n
<i>Metellina merianae</i> (SCOPOLI)	c, n
<i>M. segmentata</i> (CLERCK)	c
<i>Tetragnatha obtusa</i> C. L. KOCH	n
<i>Tetragnatha</i> sp.	k
Araneidae	
<i>Araneus cucurbitinus</i> Linnaeus	c
Linyphiidae	
<i>Bathyphantes gracilis</i> (BLACKWALL)	c
<i>Centromerus sylvaticus</i> (BLACKWALL)	n
<i>C. celarius</i> (SIMON)	c
<i>Centrophantes roeweri</i> (WIEHLE)	c
<i>Ceratinella minor</i> KULCZYNSKI	n
<i>Diplocephalus crassilobus</i> (SIMON)	c
<i>D. cristatus</i> (BLACKWALL)	c, n
<i>D. cf. connectens</i> KULCZYNSKI	c
<i>D. latifrons</i> (O. P. CAMBRIDGE)	c
<i>Drapetisca socialis</i> (SUNDEWALL)	c
<i>Gonatium rubellum</i> (BLACKWALL)	c
<i>Labulla thoracica</i> (WIDER)	c
<i>Leptyphantes alacris</i> (BLACKWALL)	c
<i>L. cristatus</i> MENGE	c, n

<i>L. flavipes</i> (BLACKWALL)		c, n
<i>L. fragilis</i> (THORELL)		c
<i>L. minutus</i> (BLACKWALL)		c
<i>L. monticola</i> (KULCZYNSKI)		c
<i>L. notabilis</i> KULCZYNSKI		c
<i>L. pallidus</i> (O. P. CAMBRIDGE)		n
<i>L. tenebricola</i> (WIDER)		c
<i>L. triglavensis</i> MILLER & POLENEC	E	c
<i>Linyphia clathrata</i> SUNDEWALL		c
<i>Macrargus rufus</i> (WIDER)		c
<i>Neriere pelatat</i> (WIDER)		c
<i>Oreonetides firmus</i> (O. P. CAMBRIDGE)		c, n
<i>Porrhoma convexum</i> WESTRING		c, n
<i>P. kolosvaryi</i> KRATOCHVÍL		c
<i>P. mycrops</i> ROEWER		c
<i>P. myops</i> SIMON		c, n
<i>P. pygmaeum</i> (BLACKWALL)		c
<i>Prosopotheca monoceros</i> (WIDER)		c
<i>Troglohyphantes cornutus</i> DEELEMEN-REINHOLD		c
<i>T. diabolicus</i> DEELEMEN-REINHOLD	E	c, n
<i>T. diurnus</i> KRATOCHVÍL		c
<i>T. excavatus</i> FAGE		c, n
<i>T. gamsi</i> DEELEMEN-REINHOLD	E	c
<i>T. helsdingeni</i> DEELEMEN-REINHOLD	E	n
<i>T. karawankorum</i> DEELEMEN-REINHOLD	E	c
<i>T. navicordis</i> THALER		n
<i>T. cf. poleneci</i> (WIEHLE)	E	c
<i>T. polyophthalmus</i> JOSEPH <i>sensu</i> FAGE	E	c
<i>T. sbordonii</i> BRIGNOLI		c
<i>T. subalpinus</i> THALER		c, n
<i>T. thaleri</i> MILLER & POLENEC		c, n
<i>T. typhlonetiformis</i> ABSOLON & KRATOCHVÍL	T	c
<i>T. wiehlei</i> MILLER & POLENEC		c
Pholcidae		
<i>Pholcus phalangioides</i> (FUESSLIN)		c, n
Lycosidae		
<i>Pardosa lugubris</i> (WALCKENÄR)		c
<i>Trochosa terricola</i> MILLER & POLENEC		n
<i>Trochosa</i> sp.		c
Thomisidae		
<i>Diaea dorsata</i> FABRICIUS		c
<i>Xystichus</i> sp.		c
Philodromidae		
<i>Philodromus dispar</i> WALCKENÄR		c
Amaurobiidae		
<i>Amaurobius claustrarius</i> HAHN		c
<i>A. fenestralis</i> STROEM		c
<i>A. ferox</i> (WALCKENÄR)		c, n

OPILIONES (GRUBER, J., J. HADŽI & T. NOVAK det.; lit.)

Sironidae		
<i>Siro d. duricorius</i> (JOSEPH)		c
Cladonychiidae		
<i>Holoscotolemon unicolor</i> ROEWER		c
Nemastomatidae		
<i>Nemastoma b. bidentatum</i> ROEWER		c
<i>Paranemastoma quadripunctatum</i> (PERTY)		c, n
<i>P. bicuspidatum</i> (C. L. KOCH)		c, n
<i>Mitostoma chrysomelas</i> (HERMANN)		c, n
Trogulidae		
<i>Trogulus nepaeformis</i> (SCOPOLI)		c
<i>T. tingiformis</i> C. L. KOCH		c
Ischyropsalididae		
<i>Ischyropsalis hadzii</i> ROEWER	(T)	c
<i>I. h. hellwigi</i> (PANZER)		c, n
<i>I. kollari</i> C. L. KOCH		c
<i>I. muellneri</i> HAMANN	(T)	c
Phalangiiidae		
<i>Opilio dinaricus</i> ŠILHAVÝ		c
<i>O. ruzickai</i> ŠILHAVÝ		c
<i>Platybunus bucephalus</i> (C. L. KOCH)		c
<i>Rilaena triangularis</i> (HERBST)		c
<i>Lacinius dentiger</i> (C. L. KOCH)		c
<i>L. ephippiatus</i> (C. L. KOCH)		c
<i>Mitopus morio</i> (FABRICIUS)		c, n
<i>Gyas annulatus</i> (OLIVIER)		c
<i>G. titanus</i> SIMON		c, n
<i>Amilenus aurantiacus</i> (SIMON)		c, n
<i>Astrobunus helleri</i> (AUSSERER)		c
<i>Leiobunum rupestre</i> (HERBST)		c, n

ACARINA (TARMAN, K. & D. TOVORNIK det.)

Eupodidae		
<i>Linopodes notatorius</i> (LINNAEUS)		c
Nicolletiellidae		
Trombidiidae indet.		c, n
Phthiracaridae		
<i>Phthiracarus italicus</i> (OUDEMANS)		c
<i>Ph. piger</i> (SCOPOLI)		c
Camisidae		
<i>Camisia biurnis</i> (C. L. KOCH)		c
Hermanniellidae		
<i>Hermanniella granulata</i> (NICOLET)		c
Hermanniidae		
<i>Hermannia gibba</i> (C. L. KOCH)		c
Damaeidae		
<i>Epidamaeus bituberculatus</i> (KULCZYNSKI)		c
<i>Spatiodamaeus verticillipes</i> (NICOLET)		c

Belbidae		
<i>Metabelba platynota</i> GRANDJEAN		c
Eremaeidae		
<i>Eremaeus oblongus</i> C. L. KOCH		c
Carabodidae		
<i>Carabodes marginatus</i> (MICHAEL)		c
Opiidae		
<i>Multioppia glabra</i> MIHELČIČ		c
<i>Oppia decipiens</i> PAOLI		c
<i>O. m. minus</i> PAOLI		c
<i>O. ornata</i> (OUDEMANS)		c
<i>Oppia</i> sp. n.		c
<i>O. translamellata</i> (WILLMANN)		c
<i>Quadroppia quadricarinata</i> (MICHAEL)		c, n
Suctobelbidae		
<i>Suctobelba trigona</i> (MICHAEL)		c
Cymbaeremaeidae		
<i>Cymbaeremaeus cymba</i> (NICOLET)		c
Scutoverticidae		
<i>Scutovertex minutus</i> (C. L. KOCH)		c
Oribatulidae		
<i>Zygoribatula exilis</i> (NICOLET)		c
Chamobatidae		
<i>Chamobates alpinus</i> SCHWEIZER		c
<i>Ch. cuspidatus</i> (MICHAEL)		c
<i>Ch. schultzi</i> (OUDEMANS)		c
Ceratozetidae		
<i>Ceratozetes piritus</i> GRANDJEAN		c
<i>Ceratozetes</i> sp.		c
<i>Sphaerozetes piriformis</i> (NICOLET)		c
Pelopidae		
<i>Eupelops torulosus</i> C. L. KOCH		c
Oribatellidae		
<i>Oribatella calcarata</i> (C. L. KOCH)		c
<i>O. meridionalis</i> BERLESE		c
Archipteriidae		
<i>Archipteria punctata</i> (NICOLET)		c
Galumnidae		
<i>Galumna tenuiclavus</i> (BERLESE)		c
Parasitidae indet.		c, n
Poecilochiridae indet.		c
Ixodidae (TOVORNIK, D. det.)		
<i>Ixodes vespertilionis</i> C. L. KOCH		c
<i>I. hexagonus</i> LEACH		c
Spinturnicidae		
<i>Spinturnix</i> sp.		c

TARDIGRADA not sampled

CHILOPODA (MATIC, Z. & A. STENTZER det.; lit.)

Lithobiidae

Eupolybothrus (E.) grossipes (C. L. KOCH) c*Lithobius (L.) agilis* C. L. KOCH c*L. (L.) p. punctatus* (C. L. KOCH) c

Scolioplanidae

Strigamia cf. acuminata (LEACH) c

DIPLOPODA (STRASSER, K. & N. MRŠIĆ det.; lit.)

Glomeridae

Glomeris (Eurypleuomeris) conspersa C. L. KOCH c*G. (Stenopleuomeris) cf. norica* LATZEL c*G. (S.) pustulata* LATREILLE c*Haploglomeris multistriata* (C. L. KOCH) c

Glomeridellidae

Glomeridella minima LATZEL c

Trachysphaeridae

Trachysphaera costata WAGA c*T. cf. noduligera* (VERHOEFF) c

Polydesmidae

Brachydesmus (B.) carniolensis VERHOEFF T E c*B. (B.) dorsolucidus* STRASSER T E c*B. (B.) h. herzegowinensis* VERHOEFF T c, n*B. (B.) h. septentrionalis* STRASSER T E c*B. (B.) subterraneus* HELLER T c*B. (B.) troglobius* DADAY T c*Polydesmus (P.) complanatus illyricus* VERHOEFF c, n*P. (Spanobrachium) c. collaris* C. L. KOCH c*Polydesmus monticolus* LATZEL c*P. (Acanthotarsus) e. edentulus* (C. L. KOCH) c*P. (A.) e. bidentatus* VERHOEFF c*P. (A.) e. plitvicensis* VERHOEFF c

Strongylosomatidae

Strongylosoma stigmatosum EICHENWALD

Haaseidae

Haasea (O.) fonticulorum VERHOEFF c*H. (Bracybainosoma) pretneri* (STRASSER) E c

Anthroleucosomatidae

Haasia largescutata parallela (STRASSER) E c

Heteroporatidae

Heteroporatia mutabilis LATZEL n

Attemsidae

Coelogonium cavernarum STRASSER E c*Iulialpium alabardatum* STRASSER E c*Mecogonopodium b. bohiniense* STRASSER E c*M. b. parvulum* STRASSER E c*M. zirianus* MRŠIĆ E c*Polyphematia moniliformis* (LATZEL) c*Stiphrogonium a. attemsi* STRASSER E c

<i>S. a. celeae</i> MRŠIĆ	E	c
<i>Symphysophys s. serkoi</i> STRASSER		c, n
<i>Tylogonium nivifidele</i> STRASSER	E	c
<i>Glomogonium k. karawankarum</i> STRASSER	E	c
<i>G. k. intermedium</i> MRŠIĆ	E	c
<i>G. k. saviniense</i> MRŠIĆ	E	c
Craspedosomatidae		
<i>Asandalum</i> sp.		c
Iulidae		
<i>Cylindroiulus (C.) luridus</i> (C. L. KOCH)		c
<i>C. (Bracheioiulus) boleti</i> C. L. KOCH		c
<i>C. (Cannioiulus) dicentrus</i> LATZEL		c
<i>C. (Ypsiloniulus) groedensis</i> (ATTEMS)		c
<i>Leptoiulus (L.) vagabundus</i> (LATZEL)		c
<i>Ommatoiulus sabulosus</i> (LINNAEUS)		c
cf. <i>Pachyiulus</i> sp.		c
<i>Styrioiulus</i> cf. <i>pelidnus</i> (LATZEL)		n
<i>Unciger foetidus</i> (C. L. KOCH)		c
Blaniulidae		
<i>Nopoiulus venustus</i> (MEINERT)		n
PAUROPODA indet.		
SYMPHYLLA indet.		
COLLEMBOLA (ČERVEK, S. det.)		
Poduridae indet.		c, n
Hypogastruridae		
<i>Hypogastrura purpurascens</i> (LUBBOCK)		c
Onychiuridae		
<i>Onychiurus gracilis</i> (Jul. MÜLLER)	T	c, n
<i>Onychiurus</i> spp.	T	c, n
<i>Terodontophora bielanensis</i> (WAGA)		c
Isotomidae		
<i>Isotomurus palustris</i> (O. F. MÜLLER)		c
<i>I. subterraneus</i> STACH		c
<i>Isotoma notabilis</i> SCHÄFFER		c
<i>Isotomiella minor</i> (SCHÄFFER)		c
Oncopodidae		
<i>Oncopodura cavernarum</i> STACH	E	c
<i>O. crassicornis</i> SHOEBOTAN		c, n
Tomoceridae		
<i>Tomocerus minor</i> (LUBBOCK)		c, n
<i>T. flavescens</i> (TULLBERG)		c, n
<i>T. unidentatus</i> (BÖRNER)		c, n
Entomobryidae		
<i>Heteromurus nitidus</i> (TEMLETON)		c
<i>Lepidocyrtus curvicollis</i> BOURLET		c, n
<i>L. cyaneus</i> (TULLBERG)		c

<i>Orchesella cf. hungarica</i> STACH		c, n
<i>Pseudosinella subvirei</i> BONET	T	c
Sminthuridae		
<i>Arrhopalites pygmaeus</i> WANKEL		c
<i>Arrhopalites</i> sp.		c
DIPLURA indet.		
Campodeidae		
<i>Plusiocampa</i> sp.	T	c
PROTURA (NOSEK, F. det.)		
Acerentomonidae		
<i>Acerentomon kustorae</i> NOSEK		E c
THYSANURA indet.		
Machilidae		
EPHEMEROPTERA indet.		
PLECOPTERA indet.		
SALTATORIA (US, P. & T. NOVAK det.)		
Rhaphidophoridae		
<i>Troglophilus cavicola</i> (KOLLAR)		c, n
<i>T. neglectus</i> KRAUSS		c, n
Tettigoniidae		
<i>Tettigonia</i> sp.		c
DERMAPTERA indet.		
Forficulidae		
BLATTARIA indet.		
Blattellidae		
<i>Ectobius</i> sp.		c
PSOCOPTERA indet.		c, n
THYSANOPTERA indet.		c
MECOPTERA (DEVETAK, D. det.)		
Boreidae		
<i>Boreus hyemalis</i> (LINNAEUS)		c
<i>B. westwoodi</i> HAGEN		c
NEUROPTERA (DEVETAK, D. det.)		
Myrmeleontidae		
<i>Myrmeleon formicarius</i> LINNAEUS		c, n
<i>Euroleon nostras</i> GEOFFROY in FOURCROY		c, n

HOMOPTERA, CICCADINA indet.			c, n
Aphididae indet.			c
HETEROPTERA indet.			c, n
COLEOPTERA (PRETNER, E., B. DROVENIK, S. POLAK & P.ZWICK det.; lit.)			
Carabidae			
<i>Abax carinatus</i> DUFTSCHMIDT			c
<i>Abax</i> sp.			c, n
<i>Agonum (Platynus) scrobiculatum</i> FABRICIUS			c
<i>Anophthalmus a. ajdovskanus</i> GANGLBAUER	T	E	c
<i>A. a. concubinus</i> J. MÜLLER	T	E	c
<i>A. a. kaplai</i> DAFFNER	T	E	c
<i>A. a. naraglavi</i> MLEJNEK & MORAVEC	T	E	c
<i>A. a. pretneri</i> J. MÜLLER	T	E	c
<i>A. alphonsi alphonsi</i> MÜLLER	T	E	c
<i>A. a. lubnicensis</i> MÜLLER	T	E	c
<i>A. a. skofjeloscensis</i> DAFFNER	T	E	c
<i>A. bernhaueri</i> GANGLBAUER	T	E	c
<i>A. b. besnicensis</i> PRETNER	T	E	c
<i>A. b. frater</i> DAFFNER	T	E	c
<i>A. egonis</i> J. MÜLLER	T	E	c
<i>A. erebus erebus</i> KRAUSS	T	E	c
<i>A. e. bozoi</i> MLEJNEK & MORAVEC	T	E	c
<i>A. e. kraussi</i> WINKLER	T	E	c
<i>A. f. fallaciosus</i> J. MÜLLER	T	E	c
<i>A. gobanzi weberi</i> GANGLBAUER	T	E	c
<i>A. hitleri</i> SCHEIBEL	T	E	c
<i>A. kahleni</i> DAFFNER	T	E	c
<i>A. kofleri</i> DAFFNER	T	E	c
<i>A. m. manhartensis</i> MESCHNIGG	T	E	c
<i>A. m. fuartensis</i> COLLA	T	E	c
<i>A. m. mariae</i> SCHATZMAYR	T		c
<i>A. micklitzii</i> GANGLBAUER ssp.	T	E	c
<i>A. nivalis</i> G. MÜLLER	T	E	c
<i>A. p. pretneri</i> MÜLLER	T	E	c
<i>A. p. ceji</i> VREZEC	T	E	c
<i>A. p. savinjscensis</i> DAFFNER	T	E	c
<i>A. sch. schaumii</i> SCHAUM	T	E	c
<i>A. sch. knirschi</i> WINKLER	T	E	c
<i>A. sch. macromelas</i> JEANNEL	T	E	c
<i>A. sch. silvicola</i> JEANNEL	T	E	c
<i>A. scopolii episcopalis</i> G. J. MÜLLER	T	E	c
<i>A. sch. schmidti gspani</i> REITTER	T	E	c
<i>A. tolminensis</i> (MÜLLER)	T	E	c
<i>Aphaenopidius kannikensis</i> DROVENIK	T	E	c
<i>A. t. treulandi</i> J. MÜLLER	T	E	c
<i>A. t. cephalotes</i> KNIRSCH	T	E	c

<i>Bembidion</i> sp.			c
<i>Carabus (Megadontus) germari</i> STURM			c
<i>C. (Porcrustes) coriaceus</i> LINNAEUS			c
<i>Cychrus attenuatus</i> FABRICIUS			c
<i>C. rostratus hoppei</i> GANGLBAUER			n
<i>Duvalius e. exaratus</i> SCHAUM			c
<i>Antisphodrus schreibersi</i> KÜSTER			c, n
<i>Leistus</i> sp.			c
<i>Nebria germari</i> HEER			c
<i>Orotrechus g. globulipennis</i> (SCHAUM)	T	E	c, n
<i>O. koflerianus</i> DAFFNER	T	E	c
<i>O. lucensis</i> SCHEIBL	T	E	c
<i>O. slapniki</i> DROVENIK, MLEJNEK & MORAVEC	T	E	c
<i>O. subpannonicus</i> DAFFNER	T	E	c
<i>O. novaki</i> MLEJNEK, MORAVEC & UDRŽAL	T	E	c
<i>Pterostichus fasciatopunctatus</i> CREUTZER			c
<i>P. metallicus</i> (FABRICIUS)			c
<i>Trechus croaticus</i> DEJEAN			c
<i>T. r. rotundipennis</i> DUFTSCHMIDT			c
<i>T. r. cordicollis</i> MÜLLER			c
Ptiliidae indet.			c
Cholevidae			
Bathysciinae			
<i>Batyscia m. montana</i> SCHIÖDTE			c
<i>B. m. forticornis</i> JOSEPH		E	c
<i>Batysciola silvestris</i> (MOTSCHOULSKY)			c
<i>Aphaobiella b.-l. budnar-lipoglavseki</i> PRETNER	T	E	c
<i>A. b.-l. mozirjensis</i> PRETNER	T	E	c
<i>A. tisnicensis</i> PRETNER	T	E	c, n
<i>Aphaobius (A.) h. heydeni</i> REITTER	T	E	c
<i>A. (A.) h. robustus</i> J. MÜLLER	T	E	c
<i>A. (A.) m. milleri</i> SCHMIDT	T	E	c
<i>A. (A.) m. alphonsi</i> J. MÜLLER	T	E	c
<i>A. (A.) m. fortesculptus</i> J. MÜLLER	T	E	c
<i>A. (A.) m. grabowskii</i> J. MÜLLER	T	E	c
<i>A. (A.) m. knirschi</i> J. MÜLLER	T	E	c
<i>A. (A.) m. kraussi</i> J. MÜLLER	T	E	c
<i>A. (A.) m. lubnicensis</i> J. MÜLLER	T	E	c
<i>A. (A.) m. pretneri</i> J. MÜLLER	T	E	c
<i>A. (A.) m. winkleri</i> MANDL	T	E	c
<i>A. (A.) muellerianus</i> PRETNER	T	E	c
<i>Ceuthmonocharis (C.) freyeri</i> (L. MÜLLER)	T	E	c
<i>C. (C.) netolitzkyi kodrici</i> (G. MÜLLER)	T	E	c
<i>C. (C.) pusillus</i> JEANNEL	T	E	c
<i>C. (C.) r. robici</i> (GANGLBAUER)	T	E	c
<i>C. (C.) r. staudacheri</i> J. MÜLLER	T	E	c
<i>Sphaerobathyscia hoffmanni</i> (MOTSCHOULSKY)			c
<i>Pretneria droveniki</i> ETONTI	T	E	c
<i>P. m. metkae</i> BOGNOLO	T	E	c

<i>P. metkae mirae</i> BOGNOLO & KOFLER	T	E	c
<i>P. saulii</i> G. MÜLLER	T	E	c
<i>P. triglavensis</i> PRETNER	T	E	c
<i>Oryotus m. micklitzi</i> REITTER	T	E	c
<i>O. m. indentatus</i> PRETNER	T	E	c
<i>O. raduhensis</i> DROVENIK, MLEJNEK & MORAVEC	T	E	c
Cholevinae (ZWICK, P. det.)			
<i>Apocatops nigrita</i> (ERICHSON)			c
<i>Catops fuliginosus</i> (ERICHSON)			c, n
<i>C. longulus</i> KELLNER			c
<i>C. neglectus</i> KRATZ			c
<i>C. cf. nigricans</i> SPENCE			c
<i>C. picipes</i> FABRICIUS			c, n
<i>C. subfuscus</i> KELLNER			c, n
<i>C. tristis</i> (PANZER)			c, n
<i>Choleva angustata</i> (FABRICIUS)			c
<i>Ch. cisteloides</i> (FRÖLICH)			c
<i>Ch. glauca</i> BRITTEN			c
<i>Ch. sturmi</i> (BRISOUT)			c, n
<i>Fissocatops westi</i> (KROGERUS)			c
<i>Nargus wilkini</i> (SPENCE)			n
<i>Sciopdrepoidea watsoni</i> (SPENCE)			c
Lionidae indet.			c
Leptinidae			
<i>Leptinus illyricus</i> BESSUCHET	T		c
Nitidulidae indet.			
			c
Silphidae			
<i>Necrophilus subterraneus</i> DAHL			c
<i>Necrophorus humator</i> FABRICIUS			c
<i>N. vespillo</i> LINNAEUS			c
<i>N. vespilloides</i> HERBST			c
Scydmaenidae indet.			
			c
Staphylinidae (DROVENIK, B., E. PRETNER & P. ZWICK det.)			
<i>Atheta</i> spp.			c
<i>Lathrobium (Glyptomerus) cavicola</i> J. MÜLLER	T	E	c
<i>Lathrimaeum</i> sp.			c
<i>Omalium</i> sp.			c
<i>Philontus</i> sp.			c
<i>Phyllodrepa</i> sp.			c
<i>Proteinus</i> sp.			c, n
<i>Quedius mesomelinus</i> MARSHAM			c
Pselaphidae (KARAMAN, Z. det.; lit.)			
<i>Bryaxis argus</i> KRATZ			c
<i>B. erichsoni ursus</i> (REITTER)			c
<i>Bythoxenus subterraneus</i> MOTSCHOUJSKY	T		c
<i>Machaerites subterraneus</i> L. MÜLLER	T	E	c
Lampyridae			
<i>Lampyris noctiluca</i> LINNAEUS			c
Cryptophagidae			

<i>Cryptophagus</i> sp.		c
Endomychidae (PRETNER, E. det.)		
<i>Endomychus coccineus</i> LINNAEUS		c
<i>Micetina cruciata</i> (SCHALLER)		c
Ptinidae (ZWICK, P. det.)		
<i>Ptinus</i> sp.		c
Curculionidae		
<i>Otiorrhynchus elegantulus</i> (GERMAR)		c
<i>Troglorrhynchus anophthalmus</i> F. SCHMIDT	T	c
Scarabeidae		
<i>Geotrupes stercorarius</i> (LINNAEUS)		c, n
Dermestidae indet.		n
Elateridae indet.		c
Scolytidae indet.		c
Ptiliidae indet.		c
Cantharidae		
<i>Cantharis</i> sp.		c
Chrisomelidae		
<i>Chrisochloa</i> sp.		c
HYMENOPTERA (BOURNE, J. D., M. MEDEN & T. NOVAK det.)		
Ichneumonidae (BOURNE, J. D. det.)		
<i>Amblyteles armatorius</i> (FORSTER)		c
<i>A. quadripunctorius</i> MÜLLER		c, n
<i>Exephanes hilaris</i> (GRAUENHORST)		c
Cynipoidea		c, n
Formicidae (MEDEN, M. det.)		
<i>Camponotus</i> sp.		c
<i>Chthonolasius</i> sp.		c
Proctotrypidae (NOVAK, T. det.)		
<i>Exallonyx longicornis</i> NEES		c
TRICHOPTERA (lit.)		
Limnephilidae		
<i>Micropterna</i> sp.		c
<i>Stenophylax permistus</i> Mc LACHLAN		c, n
LEPIDOPTERA (CARNELUTTI, J. det.)		
Nymphalidae		
<i>Inachis io</i> (LINNAEUS)		c
Notodontidae		
<i>Lophopteryx camelina</i> LINNAEUS		c
Noctuidae		
<i>Apamea monoglypha</i> HUFNAGEL		c
<i>Conistra vaccinii</i> LINNAEUS		c
<i>Diarsia brunnea</i> SCHIFFERMÜLLER		c
<i>Hypaena proboscidalis</i> LINNAEUS		c
<i>H. rostralis</i> LINNAEUS		c
<i>Noctua pronuba</i> LINNAEUS		c

<i>Scoliopteryx libatrix</i> LINNAEUS	c, n
<i>Zunclopnatha tarsipennalis</i> TREITSCHKE	c
Geometridae	
<i>Geometra papilionaria</i> LINNAEUS	c
<i>Triphosa dubitata</i> LINNAEUS	c, n
<i>T. sabaudiata</i> DUPONCHEL	c
<i>Melanthia procellata</i> DENIS & SCHIFFERMÜLLER	c
Tineidae indet.	c
Acrolepiidae (NOVAK, T. det.)	
<i>Digitivalva (Acrolepia) pulicariae</i> KLIMETSCH	c
Pterophoridae	
<i>Pterophorus</i> sp.	c
Psychidae	
<i>Agithia</i> sp.	c

DIPTERA (SIVEC, N., J. D. BOURNE, E. CHRISTIAN & R. WAGNER det.)

Trichoceridae	
<i>Diazosoma hirtipenne</i> SIEBKE	c
<i>Trichocera maculipennis</i> MEIGEN	c, n
<i>T. regelationis</i> LINNAEUS	c
Tipulidae	
<i>Tipula</i> sp.	c
Limoniidae CHRISTIAN, E. & N. SIVEC det.)	
<i>Limonia nubeculosa</i> MEIGEN	c, n
<i>Chionea alpina</i> BEZZI	c
<i>Niphadobata austriaca</i> CHRISTIAN	c, n
Psychodidae (WAGNER, R. det.)	
<i>Psychoda albipennis</i> ZETERSTEDT	n
<i>P. erminea</i> EATON	c
<i>P. gemina</i> EATON	n
<i>P. parthenogenetica</i> (TONNOIR)	c, n
<i>P. phalaenoides</i> LINNAEUS	n
<i>P. aff. minuta</i> BANKS	c
<i>Threticus</i> sp.	c
Culicidae	
<i>Culex pipiens</i> LINNAEUS	
Chironomidae indet.	c, n
Anisopodidae	
<i>Sylvicola fenestralis</i> (SCOPOLI)	c
Mycetophilidae	
<i>Bolitophila</i> cf. <i>cinerea</i> MEIGEN	c
<i>Exechia</i> sp.	c
<i>Euphylidorea</i> cf. <i>lineola</i> (MEIGEN)	c
<i>Rhymosia</i> cf. <i>fasciata</i> MEIGEN	c
<i>Rh.</i> cf. <i>tarnanii</i> DZIEDZICKI	c
<i>Speolepta leptogaster</i> WINNERZ	c, n
<i>Tarnenia</i> cf. <i>fenestralis</i> (MEIGEN)	c
<i>Zelmira</i> cf. <i>fasciata</i> MEIGEN	c

Sciaridae	
<i>Psilosciara</i> sp.	c
Scatopsidae	
<i>Scatopse</i> cf. <i>notata</i> (LINNAEUS)	c
Cecidomyiidae indet.	c, n
Dolichopodidae indet.	c
Phoridae	c, n
Diploneurini gg. spp.	c, n
<i>Megaselia</i> sp.	c
Syrphidae	
<i>Eristalomya tenax</i> (LINNAEUS)	c
<i>Scaeva pyrastris</i> (LINNAEUS)	c
Helomyzidae	c, n
<i>Amoebaleria</i> sp.	c
<i>Helomyza</i> cf. <i>captiosa</i> GORODKOV	c
<i>Theleida</i> sp.	c
Dryomyzidae indet.	c, n
Sphaeroceridae	c, n
<i>Leptocera</i> sp.	c
Drosophilidae	c, n
<i>Dorsophila</i> cf. <i>simulans</i> STURTEVANT	c
Muscidae indet.	c, n
Nycteribiidae	
<i>Nycteribia schmidti</i> SCHINER	c
Calliphoridae	
<i>Calliphora erythrocephala</i> MEIGEN	c, n
Simuliidae indet.	n
Anthomyiidae indet.	c
SIPHONAPTERA (BRELIH, S. det.)	
Vermipsyllidae	
<i>Chaetopsylla</i> (<i>Ch.</i>) <i>globiceps</i> (TASCHENBERG)	c
Hystricopsyllidae	
<i>Hystricopsylla</i> (<i>H.</i>) <i>t. talpae</i> (CURTIS)	c
<i>H. (H.) t. orientalis</i> SMIT	c
<i>Rhadinopsylla</i> (<i>Rectofrontia</i>) <i>i. integella</i> JORDAN &	c
ROTHSCHILD	
Ceratopsyllidae	
<i>Monopsyllus s. sciurorum</i> (SCHRANK)	c
AMPHIBIA (NOVAK, T. det.)	
Salamandridae	
<i>Salamandra s. salamandra</i> LINNAEUS	c, n
Discoglossidae	
<i>Bombina variegata</i> LINNAEUS	c
Bufonidae	
<i>Bufo b. bufo</i> LINNAEUS	c
Hylidae	
<i>Hyla arborea</i> (LINNAEUS)	c

Ranidae	
<i>Rana arvalis</i> NILSSON	c
<i>R. dalmatina</i> BONAPARTE	c
<i>R. temporaria</i> LINNAEUS	c
REPTILIA (NOVAK, T. det.)	
Colubridae	
<i>Natrix tessellata</i> (LAURENTI)	c
AVES (BATIČ, F. & T. NOVAK det.)	
Tytoidea	
<i>Tyto alba</i> (SCOPOLI)	c
Strigidae	
<i>Strix aluco</i> LINNAEUS	c
Cinclidae	
<i>Cinclus cinclus</i> (LINNAEUS)	c
Paridae	
<i>Parus montanus</i> BALDENSTEIN	c
Corvidae	
<i>Pyrrhocorax graculus</i> (LINNAEUS)	c
MAMMALIA (KRYŠTUFEK, B., B. PETROV, F. JANŽEKOVIČ & T. NOVAK det.)	
Erinaceidae	
<i>Erinaceus concolor</i> MARTIN	c
Soricidae	
<i>Sorex alpinus</i> SCHNIZ	c, n
<i>S. araneus</i> LINNAEUS	c
<i>S. minutus</i> LINNAEUS	c
<i>Crocidura leucodon</i> (HERMANN)	c
Rhinolophidae	
<i>Rhinolophus ferrumequinum</i> (SCHREBER)	c, n
<i>Rh. hipposideros</i> (BECHSTEIN)	c, n
Vespertilionidae	
<i>Myotis myotis</i> (BORKHAUSEN)	c, n
<i>M. daubentoni</i> (KUHL)	c
<i>M. nattereri</i> (KUHL)	c
<i>M. emarginatus</i> (GEOFFROY)	c
<i>Pipistrellus pipistrellus</i> (SCHREBER)	c
<i>Eptesicus serotinus</i> (SCHREBER)	c
<i>Barbastella barbastellus</i> (SCHREBER)	c, n
<i>Plecotus auritus</i> (LINNAEUS)	c
<i>P. austriacus</i> (FISCHER)	c
<i>Miniopterus schreibersi</i> (KUHL)	c, n
Muridae	
<i>Clethrionomys glareolus</i> (SCHREBER)	c, n
<i>Chionomys nivalis</i> (MARTINS)	c
<i>Apodemus flavicollis</i> (MELCHIOR)	c, n
<i>A. sylvaticus</i> (LINNAEUS)	c, n

Gliridae	
<i>Glis glis</i> (LINNAEUS)	c, n
Canidae	
<i>Vulpes vulpes</i> (LINNAEUS)	c
Mustelidae	
<i>Mustela erminea</i> LINNAEUS	c
<i>Martes foina</i> (ERXLEBEN)	n
Bovidae	
<i>Rupicapra rupicapra</i> (LINNAEUS)	c

DISCUSSION

This checklist of terrestrial fauna recorded in the cavities of northern and central Slovenia up to 2005 represents a compilation of data in accordance with present knowledge. Data from older literature were completed, some taxonomical names replaced by new valid ones, and some inaccuracies were avoided. The pseudoscorpion *Neobisium brevipes* (FRIVALDSKY), e. g., was excluded from the faunal list as it does not live in Slovenia. Nevertheless, some recent data also require prudent consideration, especially the great number of subspecies in the *Anophthalmus* species. In future genetic as well as morphometrical analyses, based on a series of individuals, the number of these taxa will undoubtedly shrink.

In the 55 cavities, beside the determined taxa, about 1500 tubes and microscopic preparations of collected acari, pseudoscorpions, springtails, diplurans, adult caddis flies, and ichneumonids were sent to certain specialists, but for various reasons not returned. Some of the acari, springtails and ichneumonids were determined, while the rest of material was not (neither have the determination lists been published, nor sent to the author). The list given in this article is thus incomplete. At least 100 more species are expected within these groups.

Ecologically, about three quarters of the cited taxa belong to the troglonexes, which are epigeic taxa that inhabit the entrance parts of cavities, and appear there occasionally in low frequencies. The troglaphiles, which inhabit mostly hypogean habitats in between the entrance and the inner cavity parts, were not as numerous but most abundant in the cavities. The troglobites are subterranean taxa, mostly inhabiting fissure and crack systems adjacent to cavities. For this reason the majority of these are to be found in the inner sections of cavities, but only a few species are abundant there. In summary, there were 101 (22.2%) troglobitic species and subspecies, and 114 (22.6%) species and subspecies endemic to the territory of Slovenia. 327 (71.9%) of species have been found only in cavities within carbonate rocks, 102 (22.4%) in carbonate as well as in non-carbonate rocks, and 26 (5.7%) only within cavities in non-carbonate rocks. This result is partly caused by the fact that most cavities were investigated in carbonate rocks.

POVZETEK

V letih 1977-2001 smo sistematsko raziskovali kopensko favno in ekološke razmere v 55 jamah in izkopanih rovih severne in osrednje Slovenije. Do leta 2005 je bilo za votline tega ozemlja na stičišču alpskega, panonskega in deloma dinarskega bioma med lastnimi raziskavami ter v literaturi registriranih 456 vrst in 100 podvrst živali iz 321 rodov, pripadajočih 183 družinam. Ta taksonomski

pregled je izhodišče pri obravnavi ekoloških ter drugih razprav o kopenski favni v podzemeljskih habitatih severne in osrednje Slovenije. Predstavitev ekološko sistematsko raziskanih votlin ter uporabljenih metod in tehnik raziskav omogoča vpogled v morfologijo teh votlin ter načine raziskovanja. Favnistični pregled je nekritičen, saj je bilo v zadnjih dveh desetletjih opisanih mnogo taksonov, zlasti podvrst rodu *Anophthalmus*, ki se bodo po temeljitih biometrijskih in/ali genetskih študijah nedvomno vsaj deloma izkazali za neupravičene. Pregled tudi ni popoln, ker nekatere taksonomske skupine iz različnih razlogov niso bile obdelane; takih je po grobi oceni še vsaj 100 vrst. Ekološko pripada največ vrst troglokseptom, ki so v podzemlju pretežno naključno, zato je njihova številčnost majhna. Najštevilčnejši so osebki troglofilnih taksonov, medtem ko je število teh vrst relativno majno. Troglobiontnih vrst je relativno veliko (101 vrsta in podvrsta; 22,2 %), a so z izjemo nekaj vrst maloševilni v votlinah severne in osrednje Slovenije. 114 (22,6 %) vrst in podvrst je endemitov Slovenije. Večina vrst (71,9 %) je bila najdena v votlinah karbonatnih predelov, deloma tudi zato, ker je tam največ raziskanih votlin.

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CORRIGENDA

Unfortunately, in Novak et al. (2004b) the presentation of Simpson's index was mismatched with an another graph.

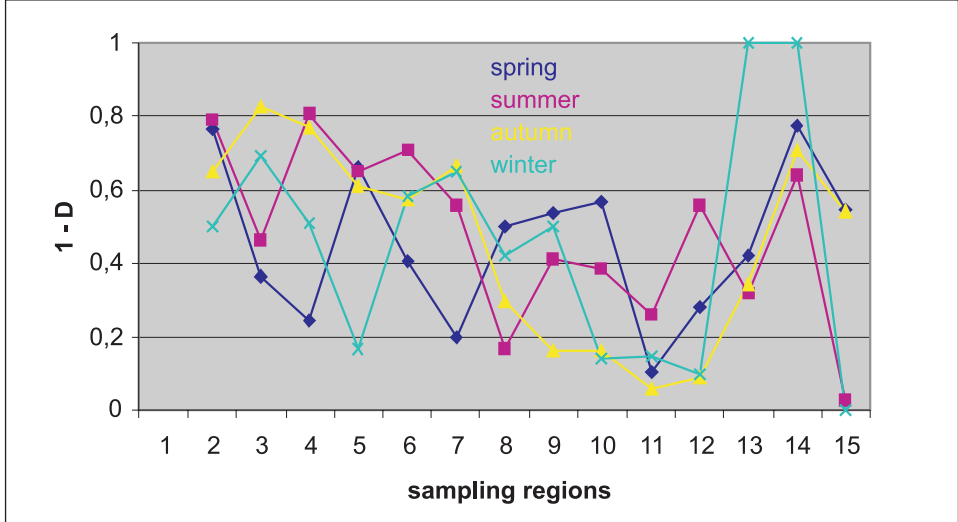


Fig. 14: Simpson's index of dominance, D , in the Železna jama cave, 2000-2001.

Sl. 14: Simpsonov indeks dominance, D , v Železni jami, 2000-2001.