

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

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DD MM YY

Designation date Site Reference Number

1. Name and address of the compiler of this form:

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2. Date this sheet was completed/updated: 1st March 2004

3. Country: Czech Republic

4. Name of the Ramsar site: Punkva subterranean stream (Podzemní Punkva)

5. Map of site included: yes

Refer to Annex III of the Explanatory Note and Guidelines, for detailed guidance on provision of suitable maps. Included is a map that delineates the wetland site by projection of the subterranean karst area onto a two-dimensional plane (ground) surface. The Ramsar site includes an area with abundant occurrence of karst phenomena, most importantly that of the caves. The site, however, does not include all sinkholes in the Punkva stream catchment. When selecting the Ramsar site borders, surface land use has been taken into account. The map also shows areas of national nature conservation designation; the whole Ramsar site lies within the Protected Landscape Area Moravský kras (PLA Moravian karst).

a) hard copy (required for inclusion of site in the Ramsar List): yes

b) digital (electronic) format (optional): yes

6. Geographical coordinates (latitude/longitude): 49° 21' - 49° 25' N, 16° 42' - 16° 47' E

7. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Located in the northern part of the Protected Landscape Area Moravský kras, about 20 km north of Brno. South-moravian Region. The whole Ramsar Site lies within Protected Landscape Area Moravský kras (PLA Moravian karst).

8. Elevation: (average and/or max. & min.) average 450 asl., min. 320 asl., max. 570 asl.

9. Area: (in hectares) 1,571 ha

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Karst area drained by the Punkva subterranean stream. Through a number of sinkholes, surface streams disappear underground where they flow into caves. Some caves, or parts thereof, are permanently filled with water - either having open water surfaces or being flooded throughout their whole profile. Other caves flood periodically and yet others have no running

water. The site hosts characteristic communities of cave fauna. Subterranean streams emerge to the surface through a number of springs.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 3, 4

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

See ANNEXES.

Criterion 1 The Punkva subterranean stream wetland system belongs to the Moravian karst area, the most valuable karst area in the Czech Republic. It has a number of sinkholes, subterranean tributaries to the Punkva stream that are connected to caves – the tributaries being permanent or periodical; there are a number of springs, the surface streams being strongly affected by the karst hydrology. The ‘Amateur Cave’ complex is the largest cave system in the Czech Republic.

Criterion 2: Amphibians – great crested newt (*Triturus cristatus*). Mammals – pond bat (*Myotis dasycneme*) and Daubenton’s bat (*Myotis daubentonii*).

Criterion 3: In the Amateur Cave complex have been found several species of fauna new to science. It is not clear whether these species are endemics or newly-described species that might have a wider distribution. They are connected to a wet-cave environment (they are troglobionts or troglaphils). In the Amateur Cave complex occur mainly troglaphiles (species preferring cave environments) or stygophiles (aquatic subterranean species), whereas troglobionts (true cave species) are much less common. Amongst the most abundant species are springtails (Collembola). Newly described for science are the springtails *Onychiurus rauseri* and *Arrhopalites ruseki*, found in the Amateur Cave complex. Other important fauna are mites (*Acarina*), e.g., a troglobiont species *Rhagidia spelaea* or a troglaphile worm *Allolobophora rosea*.

Amongst true aquatic subterranean species (stygobionts) found in the Amateur Cave complex are important crustaceans – a freshwater shrimp *Niphargus tatrensis* and an oligochaete *Bythonomus absoloni*, an endemic species described from the Jalové koryto (ravine), located at the bottom of the Macocha chasm.

Criterion 4: The site of the Punkva subterranean stream is inhabited by bats especially in winter time, where bats from a large area concentrate in these caves.

Daubenton’s bat (*Myotis daubentonii*) is abundant in caves during spring and especially during autumn passage (amounting to more than 10 % of all bats found here), it regularly overwinters in several caves; pond bat (*Myotis dasycneme*) occurs in caves rarely during spring but especially during autumn passage, though rarely overwinters.

13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region: Continental

b) biogeographic regionalisation scheme (include reference citation): 1.25 Macocha bioregion (Culek)

14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The RS Punkva subterranean stream covers a part of the karst area that is connected to the Punkva stream, including an area above sinkholes, the subterranean stream itself, and an area lying below springs. It includes two karstic canyons – Suchý and Pustý žleb (dry valley) with many entrances into caves (in Pustý žleb alone there are about 500 cave entrances). Most of the caves are short, some tens of them are of significant importance. The site further includes a karst plane with a sink depression, and terrain above the Amateur Cave complex near to Ostrov u Macochy. In this area there are a number of sinkholes connected to underground karst, often connected to large cave complexes. The bedrock is Devonian limestone (age about 360–380 million years). In the dry valleys, appear inversions of vegetation zones, and so numerous sub-montane and montane species of flora and fauna occur here. Most of the site is forested, only a small area is covered by agricultural land. The underground site itself includes permanent subterranean streams flowing through caves, connected, in places, with pools, periodical streams (so-called flood passage ways), and dry passages with no streams which, however, have a permanently high humidity of about 96 %.

15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Moravian Karst is the largest and most highly-developed karst area in the Czech Republic.

The crystalline complex is created by Proterozoic, granite rocks, being part of the Brno Massif. Devonian limestone sedimentation is represented by a variety of local limestone types. In the overlying layer are found non-karstic, Lower Carboniferous sediments of Drahany Culm – schist, turbidite (greywacke) and cobblestone. The Moravian Karst has a relief consisting of plateaux with fissures, sinkholes, swallow-holes (swallets) and springs, connecting the surface with the underground areas. Underground there exist abundant caves with a variety of cave deposits. The climate in the area is influenced by the varied local topography, so that micro- and mesoclimates play a big role. In shaded depressions, temperature inversions are common, especially in summer.

Typical soil types are grey- to dark-grey rendzinas. Also found is terra rossa – a product of limestone weathering.

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The hydrography and hydrology of the site differ substantially from those of the surrounding area. Streams originating in non-karst area of Drahanská Uplands sink below the ground immediately after entering the limestone area. Hydrography and hydrology of the area is rather complicated - some sinks and springs function depending on the water dynamics, subterranean streams cross each other at differing levels, a sink may become a spring and vice versa, etc. Surface streams are almost non-existent, subterranean streams and their catchments do not correspond with the surface relief. In the area of sinkholes, valleys with abrupt dead-ends, or partially so, have been created and streams are periodical. This karst area has its own, mainly subterranean, hydrographic systems with single erosion base being the drainage system of the Punkva stream. Detailed hydrology of the area is highly complicated and not yet fully understood. Sloupský potok and Bílá voda streams are the sources for the Punkva stream, that has a catchment area of 170 km² and average discharge of 0.96 m³.s⁻¹. Before reaching a cave, the waters of Sloupský stream, during the period of low water level,

disappear down about 20 sinkholes or infiltrate into the bottom substrate at the time of low water discharge. Thus, part of the stream is periodical. The stream disappears finally underground at Staré skály (rocks) near Sloupsko-šošůvské Caves. At a depth of 70-100m it creates the Sloupský corridor that belongs to the Amateur Cave complex. The stream Bílá voda disappears down sinkholes at Nová Rasovna. As in the case of the sinkholes of Sloupský stream, the Bílá voda stream may also dry out as a result of water infiltration before reaching the sinkholes (for some hundreds of metres). The water further continues through the caves of Piková Dáma, Spirálka and others. During the flood periods, the water may also disappear into the cave Stará Rasovna (so-called flood sinkhole). After the water runs through the Holštejn part of the Amateur Cave complex, the Punkva stream is created at the confluence of the Bílá voda and Sloupský streams. The Punkva stream then flows through mostly unknown beds to the Macocha chasm, and through the Punkva Caves to the place where it emerges at the ground surface. The vast majority of the Amateur Cave complex consists of passageways, about 34 km in length, that are flooded only at the time of flood events. The Amateur Cave complex is connected with several small streams that disappear down sinkholes at Plánivý, Jedle, Vavřinec, Suchdol, etc. The area of the Amateur Cave is marked on the surface by a row of sinkholes, such as Cigánský závrt, Měšiny, Dolina, Městikád', Hluboký and others.

The so-called Labyrinth of Malý Výtok at Pustý žleb is genetically connected to another cave system, so far little known. This 'labyrinth' is created at sinkholes along the streams of Lopač, Krasovský and Vilémovický. The interior of caves are known only in the vicinity of sinkholes, especially near to Vilémovice. Important caves are Vilémovické propadání, Kajetánův závrt and Společňák. In the area of Ostrov, there are further caves - Balcarka, Lopač, and the chasm Vintoky. The Labyrinth of Malý Výtok is, during the periods of high water table, connected with the Amateur Cave complex.

17. Wetland Types

a) presence:

Zk(b) M, N, Y

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

Zk(b); M, N, Y

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

In the vicinity of sinkholes, an interesting feature is the drying out of the stream prior to reaching the sinkhole. In the area of springs and further downstream, water quality and hydrology is influenced by its flow through the caves. Summer water temperatures are markedly lower, whilst winter temperatures are higher, the water being well-oxygenated and very hard. These waters support typical communities of springs and brooks. The caves are characterized by peculiar or extreme conditions for life, such as lack of light (green plants are therefore absent), low temperature fluctuations (temperatures usually range between 6 -10 ° C), extremely high humidity in many caves (up to 100%); these conditions are to some degree influenced by cave size. When compared to southern European karst areas, the caves of the Punkva subterranean stream are relatively poor in species. This is, most likely, caused by die off of many cave species during glaciation.

True cave fauna require high humidity, cold temperatures, do not need light, have a narrow ecological tolerance (niche). Depending on the level of adaptation to cave life and species dependence on caves, three groups have been distinguished:

Troglobiont (cave-living species) – true cave animal

Troglophile (cave-loving species) – species that prefers living in caves but can live outside too (beneath stones, in soil, etc.). Adaptation to life in caves is not so perfect.

Trogloxene (foreign species in caves) – species that might fall or be taken by water flow or otherwise to the cave.

The evolution of cave animals undergoes gradual specialization following an evolutionary line from troglaxene to troglophile to troglobiont, including a number of transitional forms. Troglobionts are relict in character. A relatively low number of species originate from the Tertiary period, as, for example, the springtails *Arrhopalites bifidus* and *A. pygmaeus*, while the majority of species (e.g. the springtail *Schaefferia emucronata*) originate from glacial periods, during which time they spread into caves.

The fauna of karst underground waters is not specific to karst areas - these species generally inhabit underground waters. As with other cave fauna, the level of adaptation of aquatic underground species varies. True underground water animals are labelled stygobionts. Stygophiles usually live in surface waters (streams) and actively enter underground waters during periods of unsuitable conditions aboveground (e.g., a number of oligochaetes). Stygoxenes are found in underground waters only rarely. A specific community, being transitional between that of the open surface and caves, have been described from the Macocha chasm.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. **Do not include here taxonomic lists of species present - these may be supplied as supplementary information to the RIS.**

With regard to the characteristics of the karst area, the only noteworthy flora is the red alga *Batrachospermum moniliforme* in the area of the Malý vývěr (spring); abundant is the aquatic moss *Fontinalis antipyretica* that creates the basis of periphyton in the Punkva stream when it re-surfaces. By the Emperor's Cave (Císařská jeskyně) near the settlement of Ostrov u Macochy has been found southern bladderwort (*Utricularia australis*).

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. **Do not include here taxonomic lists of species present - these may be supplied as supplementary information to the RIS.**

Communities of the Macocha chasm (transitional zone between the above- and below-ground). Communities of the Macocha chasm are transitional communities between cave biotopes and outside-cave biotopes, distinguished as the 5th altitudinal vegetation zone. Typical species are the springtails *Onychiurus granulatus*, *Tetradontophora bielensis*, *Folsomia quadrioculata* and the cave-springtail *Folsomia litsteri* (troglophile), and the molluscs: *Laciniaria biplicata*, *Ena montana*, *Vitrea transsylvanica*, and *Semilimax semilimax*. Amongst the beetles, most numerous is the family of *Staphylinidae*. Many species of the Macocha chasm are allochthonous species, whereas some species are, more or less, autochthonous and breed in the chasm. Amongst the latter are especially sub-montane and

montane species that require biotopes with minimal human impact, such as *Geodrumicus nigrita*, *Syntomium aeneum*, *Ancylophorus aureus*, *Philonthus decorus*, *Quentus mesomelinus*, *Chilopora longitarsis*, *Ocalea rivularis*. Endemic in the Moravian karst area is an aquatic oligochaete *Bythonomus absoloni*. Important crustaceans are *Niphargus tatrensis* and *Gammarus fossarum*, the molluscs *Bythinella austriaca* and *Ancylus fluviatilis*, found in Jalové koryto (ravine).

Cave communities: as mentioned under point 16, caves offer highly specific life conditions. Three groups of species, classed according to their level of adaption to life in caves, have been distinguished (see also point 16):

Troglobionts: Important are springtails (e.g. *Arrhopalites bifidus*, *A. pygmaeus*, *A. ruseki*, *Schaefferia emucronata*), and mites (*Oribellopsis cavatica*, *Belba clavigera* and *Parasitus spelaeus*). In this group do not occur any vertebrates.

Troglophiles: For example, the segmented worm *Eophila antipae* var. *tuberculata*, the mite *Rhagidia reflexa*, the spider *Meta menardi*, the springtail *Folsomia litsteri*, the caddisfly *Micropterna nycterobia* (adult), the beetle *Trechoblemus micros*, and several species of bats (with the exception of tree bats).

Trogloxenes: Mainly insects, around cave entrances regularly overwinter adults of moths *Scoliopteryx libatrix* and *Triphosa dubitata*.

Aquatic karst underground fauna: is not specific to karst; for more information see section 16.

Springs: typical inhabitants are the snail *Bythinella austriaca*, the mayfly *Torleya belgica*, the stonefly *Amphinemura triangularis*, and caddisflies of the genus *Rhyacophyla*. Also found was the chironomid *Syndiamesa branickii* (a montane species, known from the Tatra mountains where it goes up to 2200 asl.). The karst streams are characterized by high water hardness, oscillating discharges, drying out in summer, and, in the area of springs, by low temperatures and good oxygenation. The most abundant benthic species are crustacean *Gammarus fossarum* and mayfly *Baëtis rhodani*. Typical are submontane and montane species of brooks and streams (larvae of mayflies *Baëtis alpinus*, *B. lutkeri*, *Ecdyonurus venosus*, the stonefly *Leuctra albida*, the caddisfly *Philopotamus montanus*, the true-fly *Odagmia monticola*, etc.).

21. Social and cultural values:

e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

The cave Kůlna has archaeological value as the oldest settlement in the Moravian karst area which has been documented (110,000 years old). Also important are the ruins of two castles Holštejn and Blansek. A wind mill in the village of Ostrov has been designated a cultural monument.

In the surroundings of Sloup and Holštejn villages are numerous climbing terrains. Four caves and the Macocha chasm are accessible to the public. Almost half of the forested area is located within nature reserves, meaning that these forests will have limited commercial use. Agricultural land is in Zones I and II of nature protection (Zone I represents core zone of highest conservation value) and requires only extensive farm management.

22. Land tenure/ownership:

Majority of the land is state-owned (especially forests). However, return of land to former owners (as it was formerly prior to land nationalization in 1948) is underway. Some land is in private ownership (though mostly small areas), and a little land is owned by local councils.

(a) within the Ramsar site:

Ownership of an underground cave system is not exactly defined in Czech Law.

(b) in the surrounding area:

Surface areas are in state ownership (mainly forests), municipal ownership (some forests and non-forest land), and private ownership (mainly agricultural land and built-up areas of Ostrov by Macocha and Holštejn).

23. Current land (including water) use:

(a) within the Ramsar site:

About one third of the site has been designated at some level of reserve status under national legislation: National Nature Reserve Vývěry Punkvy; Nature Reserve Bílá voda and Nature Reserve Sloupsko-šošůvské jeskyně; thus conservation interests prevail here. As far as agricultural land is concerned, most areas are used as meadows and pastures, with only a limited area as arable land (i.e. land included because cave complexes exist underneath). Present use of the karst area is governed by nature conservation (PLA and NNR/NR - National Nature/Nature Reserves). A small part of the cave system is open to tourists, and scientific surveys are performed based on permission from the nature conservation authority. One of the smaller underground tributaries is used as a source of drinking water.

(b) in the surroundings/catchment:

Land on the surface above the karst system is used: by forestry; as agricultural land (arable, meadows and pastures); as water areas, and is partly built-up urban area. It is in the Zone I or II of the PLA (or within NNR/NR reserves). Since 2003, the agricultural land has been managed under the SAPARD programme, entitled “Methods of agricultural production complying with environmental protection and landscape conservation”, that will be followed by all other agroenvironmental programmes. Forest management follows the Forestry Management Plan, which was approved by the nature conservation authority. On a small part of the surface bed of the Punkva River controlled sport fishing is allowed.

24. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

A major problem is the discharge of untreated wastewater (from the villages of Šošůvka, Vilémovice, Vavřinec and Veselice), and poorly-treated wastewater (from the settlements of Ostrov and Sloup) that eventually reach the underground karst area. Further pollution comes from agriculture. Some impact is caused by tourism and cave exploration. Some improvements have been noted as a result of installation of wastewater treatment plants in the areas above sinkholes, changes in agricultural practices, regulations imposed in those caves with public access, and by setting up conditions for cave research (and exploration).

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

The whole RS is part of the Protected Landscape Area Moravský kras. Almost one third is also part of the National Nature Reserve (NNR) Vývěry Punkvy, with a smaller part belonging to the National Reserve (NR) Sloupsko-šošůvské jeskyně and National Reserve (NR) Bílá voda. Officially approved management plans (MPs) exist for the PLA Moravský kras, NNR Vývěry Punkvy, NR Sloupsko-šošůvské jeskyně and NR Bílá voda. All the above MPs have been prepared by the Administration of the PLA Moravský kras.

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

A strategy for agricultural management within the PLA Moravský kras that includes the RS has been prepared. Its implementation is dependent on approval of grant from the SAPARD programme.

27. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

The Agency for Landscape Conservation provides measurements of microclimatic conditions inside caves and evaluates the impact of visitors (focused on Punkevní jeskyně Caves). An assessment of saprobiological conditions upstream of sinkholes and downstream of springs, and a study of algal populations in the Punkva stream below spring (both diploma work at Masaryk University, Brno), and also research and mapping of caves (Czech Speleological Society). The transfer of this information to GIS is planned.

28. Current conservation education:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc. Two Nature Trails at Macocha and Sloupsko-šošůvské jeskyně, and a mini-Nature Trail in the vicinity of Balcarka Cave are in operation. Guided tours to caves open to the public are provided. Lectures for the general public, guided tours to the karst area (both surface and underground), and various exhibitions, are organized by the PLA Administration.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The RS is the most visited area of the Moravian karst, as it includes all four caves with public access. The Punkva Caves (opened throughout the whole year) are visited by more than 250,000 visitors every year (mainly in summer months). The other three caves with public access - Balcarka, Kateřinská Cave and Sloupsko-šošůvské Caves - are closed for three months in winter. Also the Macocha chasm has a high number of visitors. Caves are also used for speleotherapy.

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

The site is located in 10 cadastres (sub-districts): Holštejn, Lažánky u Blanska, Lipovec u Blanska, Ostrov u Macochy, Sloup v Moravském krasu, Suchdol v Moravském krasu, Šošůvka, Těchov, Vavřinec na Moravě, Vilémovice u Macochy. The whole site is located in the district of Blansko, region of S-Moravia.

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Protected Landscape Area (PLA) Moravský kras, Svitavská 29, 678 01 Blansko, with involvement of local councils and the district council Blansko. PLA Moravský kras: phone: +420-516-417-825, e-mail: schkomk@schkocr.cz

32. Bibliographical references:

scientific/technical references only. If biogeographic regionalisation scheme applied (see 13 above), list full reference citation for the scheme.

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Appendix (point 12 and 16)

Criterion 1

The wetland of the Punkva subterranean stream belongs to the Moravian karst area, the most valuable karst area in the Czech Republic. It has a number of sinkholes, subterranean tributaries to the Punkva stream that are connected to caves – the tributaries are permanent or periodical. The area has a number of springs, the surface streams being strongly affected by the karst hydrology. The Amateur Cave complex is the largest cave system in the Czech Republic, with about 34 km of cave passageways known today. However, many parts of the cave system are still not known, as, for example, the connection between the Amateur Cave and the Sloupsko-šošůvské Caves or the large areas of the deepest parts of the Amateur Cave and its connection to the Punkva subterranean stream.

Criterion 2

Vertebrate species, indicating a wetland of international importance:

Amphibians: Great crested newt (*Triturus cristatus*)

Mammals: pond bat (*Myotis dasycneme*). First occurrence of this species in the Czech Republic outside winter season (caught in nets in August and September at the entrance to Sloupská Cave, Kateřinská Cave and Cave Hladomorna). In two caves, pond bats overwinter. Daubenton's bat (*Myotis daubentonii*) is relatively abundant on this site, regularly overwintering in several caves here. On the basis of catches at the entrance to Kateřinská Cave in 1992 – 1993, the population Daubenton's bat was estimated to have between 890 – 1016 individuals.

Criterion 3

In the Amateur Cave complex have been found several species of fauna new to science. It is not clear whether these species are endemics or newly-described species that might have a wider distribution. They are connected to wet cave environment (troglobionts or troglaphils). In the Amateur Cave occur mainly troglaphils or stygophils, much less common are trogllobionts (true cave species). Amongst the most abundant are springtails (*Collembola*). Newly described for science, found in the Amateur Cave, are the springtails *Onychiurus rauseri* and *Arrhopalites ruseki*, and the beetle *Lesteva absoloni*. Other important fauna are mites (*Acarina*, e.g., a trogllobiont species *Rhadigia spelea*), and a troglphilous worm *Allolobophora rosea*.

Amongst true aquatic subterranean species (stygobionts), in the Amateur Cave, important are crustaceans – a freshwater shrimp *Niphargus tatrensis* - and an oligochaete *Bythonomus absoloni*, an endemic species described from the Jalové ravine (Jalové koryto), located at the bottom of the Macocha chasm.

The list of cave fauna at the Punkva subterranean stream - INVERTEBRATES

NEMATODA

Species	Type	Locality
<i>Dorylaimus sp.</i>		Nová Amatérská j. - lok. č. 203
<i>Mononchus sp.</i>		Nová Amat. j. - lok. č. 203
<i>Odontolaimus sp.</i>		Nová Amat. j. - lok. č. 203

OLIGOCHAETA

Species	Type	Locality
<i>Allolobophora rosea</i>		Amatérská j.
<i>Bythonomus absoloni</i>		Nová Amat. j., Jalové koryto
<i>Peloscolex ferox</i>		Nová Amat. j.
<i>Stylaria lacustris</i>		Macoča - dol. j.
<i>Stylodrilus heringianus</i>		Nová Amat. j.
<i>Trichodrilus moravicus</i>		Amat. j.?

MOLLUSCA

Species	Type	Locality
<i>Ancylus fluviatilis</i>		Kalcitový dóm (13C), Malý výtok
<i>Bythinella austriaca</i>		Kalcitový dóm (13C), Bílá voda v Amat. j., Punkva v Amat. j., Jalové koryto, Punkevní j., Malý výtok, Nová Amat. j. - Macošská trať

HYDRACARINA

Species	Type	Locality
<i>Atractides gibberipalpis</i>		Malý výtok

ACARINA

Species	Type	Locality
<i>Alicorhagia clavipilus</i>		Amat. j.
<i>Alicorhagia fragilis</i>		Amat. j.
<i>Belba clavigera</i>	TB	j. Balcarka
<i>Eugamasus cavernarum</i>		Jeskyně MK
<i>Gamasus sp.</i>		Jeskyně MK
<i>Eupodes sp.</i>		Amat. j.
<i>Geholapsis mandibularis</i>	TB	Nová Amat. j.
<i>Licneremaeus pihi</i>		Amat. j.
<i>Notaspis sp.</i>		Jeskyně MK
<i>Oribellopsis cavatica</i>	TB	Sloupské j.
<i>Parasitus kraepelini</i>		Amat. j.
<i>Parasitus spelaeus</i>	TB	Nová Amat. j.
<i>Pergamasus sp.</i>		Amat. j.
<i>Porrhostaspis lunulata</i>		Jeskyně MK
<i>Rhagidia sp.</i>	TB	
<i>Rhagidia reflexa</i>	TF	Amat. j.
<i>Rhagidia spelaea</i>	TB	Nová Amat. j.
<i>Rhagidia wolmsdorfensis</i>	TB	Nová Amat. j.
<i>Scyphius subterraneus</i>	?	Jeskyně MK

ARANEIDA

Species	Type	Locality
<i>Meta menardi</i>	TF	Amat. j.
<i>Porrhomma moravicum</i>		Nová Amat. j.

OSTRACODA

Species	Type	Locality
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<i>Candona eremita</i>	TF	Nová Amat. j. - lok. č. 203
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COPEPODA

Species	Type	Locality
<i>Acanthocyclops bicuspidatus ssp. odessanus</i>		Nová Amat. j. - lok. č. 203
<i>Acanthocyclops cf. kiefferi</i>	TB	Nová Amat. j. - lok. č. 203
<i>Acanthocyclops languidooides</i>	TF	Nová Amat. j. - lok. č. 203
<i>Acanthocyclops languidooides v. clandestinus</i>		?
<i>Acanthocyclops languidus v. belgicus</i>	TB	Nová Amat. j.
<i>Acanthocyclops languidus v. deminutus</i>	TB	Malčina j., Nová Amat. j.
<i>Acanthocyclops viridis</i>		Nová Amat. j. - lok. č. 203, Punkva (Macocho - Punkevní j.)
<i>Attheyella wierzeiskyi</i>		Punkva (Macocho - Punkevní j.)
<i>Bryocamptus spinulosus</i>		Punkva (Macocho - Punkevní j.)
<i>Canthocamptus staphylinus</i>		Punkva (Macocho - Punkevní j.)
<i>Echinocamptus echinatus</i>	TB	Nová Amat. j. - lok. č. 203
<i>Eucyclops serrulatus</i>		Malý výtok, Punkva (Macocho - Punkevní j.)
<i>Eucyclops serrulatus speratus</i>		Punkva (Macocho - Punkevní j.)
<i>Limocamptus echinatus</i>		Punkva (Macocho - Punkevní j.)
<i>Paracamptus schmeili</i>	TF	Nová Amat. j. - lok. č. 203
<i>Paracyclops fimbriatus</i>		Punkva (Macocho - Punkevní j.)
<i>Tropocyclops prasinus</i>		Punkva (Macocho - Punkevní j.)

ISOPODA

Species	Type	Locality
<i>Asellus aquaticus</i>		Macocho - dol. j., Malý výtok, Nová Amat. j. - Macošská trať, Punkva (Macocho - Punkevní j.)

AMPHIPODA

Species	Type	Locality
<i>Niphargus tatrensis</i>		Sloupské j., Ostrovská vod. j., Dóm halucinací (13C), Kalcitový dóm (13C), Punkva a Bílá voda v Amat. j., Nová Amat. j. - lok. č. 203, Macošská trať, Říčený dóm, Jalové koryto, Punkva (Macocho - Punkevní j.)
<i>Gammarus fossarum</i>		Bílá voda a Punkva v Amat. j., Jalové koryto, Punkevní jeskyně, Malý výtok, Nová Amat. j. - lok. č. 203, Macošská trať

DIPLOPODA

Species	Type	Locality
<i>Brachydesmus superus</i>		Sloupské j.

COLLEMBOLA

Species	Type	Locality
<i>Anurida grahnaria</i>	TF	Macocha - dno, Amat. j.
<i>Arrhopalites bifidus</i>	TB	Sloupsko – Šošůvské j.
<i>Arrhopalites pygmaeus</i>	TB	Punkevní j. (Pohádkový dóm), Sloupsko – Šošůvské j., Amat. j.
<i>Arrhopalites ruseki</i>	TB	Amat. j.
<i>Folsomia candida</i>	TF?	Punkevní j. (Pohádkový dóm), Sloupsko - Šošůvské j., Amat. j.
<i>Folsomia litsteri</i>	TF	Macocha - dno, Sloupsko - Šošůvské j., Punkevní j. (Reichenbachův dóm), Kateřinská j.
<i>Folsomia multiseta spelea</i>	TB	Punkevní j. (Pohádkový dóm),
<i>Folsomia quadrioculata</i>		Macocha - dno, Amat. j.
<i>Heteromurus nitidus</i>	TF	Punkevní j. (Pohádkový dóm), Sloupsko - Šošůvské j. (Eliščina j.), Kateřinská j., Amat. j.
<i>Hypogastrura bengtssoni</i>		Sloupské j.
<i>Hypogastrura purpurascens</i>		Punkevní j. (Pohádkový dóm, Vstupní dóm), Macocha – dno,
<i>Isotoma fennica</i>		Amat. j.
<i>Isotoma notabilis</i>		Macocha - dno, Punkevní j. (Pohádkový dóm, Vstupní dóm), Sloupsko – Šošůvské j.
<i>Isotoma violacea</i>		Punkevní j. (Vstupní dóm, Reichenbachův dóm, Pohádkový dóm)
<i>Isotomiella minor</i>		Sloupsko – Šošůvské j., Amat. j.
<i>Lepidocyrtus lanuginosus</i>		Amat. j.
<i>Neanura muscorum</i>		Punkevní j. (Pohádkový dóm)
<i>Neelus minimus</i>		Punkevní j. (Pohádkový dóm, Reichenbachův dóm), Sloupsko – Šošůvské j., Kateřinská j., Amat. j.
<i>Neelus murinus</i>		Sloupsko – Šošůvské j., Kateřinská j. (Zadní dóm), Punkevní j. (Vstupní dóm, Reichenbachův dóm)
<i>Onychiurus armatus</i>		Amat. j.
<i>Onychiurus fimetarius</i>		Punkevní j. (Pohádkový dóm), Sloupsko – Šošůvské j.
<i>Onychiurus pseudosibiricus</i>	TB	Punkevní j. (Vstupní dóm)
<i>Onychiurus rauseri</i>	TB	Amat. j.
<i>Onychiurus schoetti</i>	TB	Amat. j.
<i>Onychiurus sibiricus</i>	TF	Punkevní j. (Pohádkový dóm), Amat. j.
<i>Pseudosinella alba</i>		Sloupsko – Šošůvské j. (Eliščina j.)
<i>Schaefferia emucronata</i>	TB	Punkevní j. (Pohádkový dóm, Vstupní dóm), Amat. j.
<i>Tomocerus flavescens</i>		Punkevní j. (Vstupní dóm)
<i>Tullbergia jpygiformis</i>	TB	Amat. j.
<i>Tullbergia krausbaueri</i>	TF	Punkevní j. (Reichenbachův dóm), Kateřinská j. (Zadní dóm), Sloupsko – Šošůvské j., Amat. j.

EPHEMEROPTERA

Species	Type	Locality
<i>Baëtis bioculatus</i>		Punkva - Jalové koryto
<i>Ecdyonurus fluminum</i>		Bílá voda v Amat. j.
<i>Habroleptoides modesta</i>		Bílá voda v Amat. j., Jalové koryto
<i>Heptagenia lateralis</i>		Nová Amat. j. – Macošská trať, Jalové koryto
<i>Heptagenia quadrilineata</i>		Kalcitový dóm (13C), Jalové koryto, Bílá voda a Punkva v Amat.j.
<i>Paraleptophlebia submarginata</i>		Bílá voda v Amat. j.
<i>Rhitrigena semicolorata</i>		Bílá voda v Amat. j., Nová Amat. j. – Macošská trať

DIPTERA

Species	Type	Locality
<i>Eukiefferiella sp.</i>		Kalcitový dóm (13C), Punkva - vodní plavba
<i>Eusimulium latipes</i>		Bílá voda, Jalové koryto
<i>Eusimulium rubzovianum</i>		Bílá voda v Amat. j.
<i>Macropelopia nebulosa</i>		Nová Amat. j. – Macošská trať
<i>Micropsectra sk. praecox</i>		Macocha - dolní j., Punkva - plavba, Jalové koryto
<i>Orthocladius sp.</i>		Dóm halucinací (13C)
<i>Prosimulium nigripes</i>		Kalcitový dóm (13C), Jalové koryto

PLECOPTERA

Species	Type	Locality
<i>Amphinemura triangularis</i>		Punkva v Amat. j., Jalové koryto
<i>Brachiptera risi</i>		Punkva v Amat. j.
<i>Leuctra sp.</i>		Punkevní j. – plavba
<i>Leuctra albida</i>		Bílá voda v Amat. j.
<i>Nemoura sp.</i>		Dóm halucinací (13C), Kalcitový dóm, Punkva a Bílá voda v Amat. j.
<i>Nemoura cinerea</i>		Jalové koryto
<i>Protonemoura sp.</i>		Punkevní j. – plavba

COLEOPTERA

Species	Type	Locality
<i>Ancyrophorus aureus</i>		Jeskyně MK
<i>Arpedium quadrum</i>		Amatérská j.
<i>Catops longulus</i>		Amatérská j.
<i>Catops picipes</i>		Amatérská j.
<i>Elonium striatulus</i>		Amatérská j.
<i>Choleva agilis</i>		Amatérská j.
<i>Lathrobium fulvipenne</i>		Amatérská j.
<i>Lesteva pubescens</i>		Amatérská j.
<i>Ocalea rivularis</i>		Amatérská j.
<i>Ochtheophilus aureus</i>		Amatérská j.
<i>Omalium excavatum</i>		Amatérská j.
<i>Omalium validum</i>		Amatérská j.
<i>Oxytelus rugosus</i>		Amatérská j.
<i>Quedius mesomelinus</i>		Amatérská j.
<i>Quedius ochripennis</i>		Amatérská j.
<i>Trechoblemus micros</i>	TF	Amatérská j.

Note

? not certain

TB troglobiont

TF troglophile