

IMPORTANCE OF DISCOVERY OF THE FIRST CAVE BEETLE *Leptodirus hochenwartii* Schmidt, 1832

by Slavko POLAK¹

Abstract

Caves were not seriously considered as a habitat for the animals until 1831 when the first cave (troglobite) beetle was discovered in the Postojna cave. The 7 mm long troglomorphic beetle was firstly described by Ferdinand Schmidt under the name *Leptodirus hochenwartii* in the article "Contribution to the fauna of Carniola" which appeared in the Carniolian paper *Illyrisches Blatt*, on 21st January 1832. During his systematic search for additional specimens, Schmidt discovered a whole range of other cave animals but with exception of beetles he didn't scientifically described them. Schmidt was in correspondences with quite some European scientists and later many visited the Postojna and surrounding caves in the search for recently discovered reach subterranean fauna. In the years to follow, the new species of cave beetles, spiders, pseudoscorpions, millipedes, centipedes, crustaceans and snails were described by various naturalists, giving the Postojna cave the name a biospeleological Mecca and the birth place or cradle of a new biological science, the biospeleology or speleobiology. The reach subterranean fauna was later discovered in the other parts of Europe and other Continents too, but the Postojna cave is absolute record-holder respecting the number of known troglobite species even today. The *Leptodirus hochenwartii* synonymy, recent taxonomy and the conservation issues are discussed in the paper.

Resum

Les coves no varen ser considerades seriosament com a hàbitats d'animals fins 1831, quan es descobrí el primer escarabat cavernícola (troglobi) a la Cova de Postojna (Eslovènia). Aquest coleòpter, de 7 mm de longitud i caràcters troglomòrfics prou marcats, va ser descrit primerament per Ferdinand Schmidt sota el nom *Leptodirus hochenwartii* a l'article "Beitrag zu Krain's Fauna", publicat el 21 de gener de 1832 a la revista *Illyrisches Blatt*. En el decurs de la recerca per trobar més exemplars, Schmidt descobrí un ample grup d'altres animals cavernícoles però només va descriure científicament els coleòpters. Schmidt va mantenir correspondència amb un bon nombre de científics europeus, i després alguns d'ells varen visitar Postojnska Jama i les coves dels voltants en cerca de la rica fauna subterrània recentment descoberta. Durant els anys següents, les noves espècies de coleòpters, aràneïds, pseudoescorpins, diplòpodes, quilòpodes, crustacis i gasteròpodes cavernícoles varen ser descrites per diversos naturalistes, fins al punt de convertir la Cova de Postojna en el bressol d'una nova ciència, la Bioespeleologia, i en una autèntica Meca de la Biologia de les cavernes. Posteriorment la rica fauna subterrània fou també descoberta a altres regions d'Europa i als altres continents, però encara avui la Postojnska Jama manté el rècord pel que fa al nombre d'espècies troglòbies que hi viuen al seu interior. Aquest article tracta també d'altres aspectes, com ara la sinonímia de *Leptodirus hochenwartii*, la seva taxonomia més recent i els problemes de conservació que l'afecten.

Introduction

The first written document about the real cave animals in Europe dates back to 1689. In his famous book "Die Ehre des Hertzogthums Crain" (The Glory of the Duchy of Carniola) the great Carniolian polyhistor Johann Veichard Valvasor spoke about the strange animals, probably "dragon's young" that were occasionally found in some springs. At first he did not suspect that

he was in fact writing about a true cave animal, but later he recognized a sort of lizard or spring worm in this true cave salamander. In the century to follow this animal raised a great interest among the naturalists of that time. The Vienna doctor and zoologist Nicolaus Laurenti was the first who in 1768 announced the new discovery to the academic world, described the animal and named it *Proteus anguinus*. Laurenti himself did not recognise the animal as a cave animal, believing it lives in the famous Lake Cerknica. Even though several years later the finds proved that this unusual amphibian was a cave

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dweller, the scientists were much more interested in the reduction of eyes, pigments, external gills and especially in a strange development and reproduction of *Proteus* than in its cave environment (ALJANČIČ *et al.*, 1993). Underground caves were not seriously considered as a habitat for the animals by anyone until 1831 when the first cave beetle was discovered in the Postojna cave.

Discovery and first descriptions of *Leptodirus hohenwartii*

In 1818, when the local cave guide and lamp man named Luka Čeč found the inner parts of the Postojna cave, only the first 100 metres of the cave were accessible to the visitors. After his discovery the local guides penetrated underground, kilometres deep for the first time. Not only kilometres of discovered caverns with breath taking stalagmites but also the new railway path from Vienna to Trieste that passed through Postojna, were, we believe, the important reasons for the unexpected and so fast developing Postojna cave tourism.

There is not a known picture or detailed data about the local cave guide and lamp man Luka Čeč. We believe he must have been a clever and perspicacious man. 13 years after his discovery of the inner parts of the Postojna

cave, he made another unexpected discovery in the Postojna Cave too. In September 1831 he found a 7 mm long beetle, resembling a big ant in the part of the cave known as the Calvary. Despite his poor education he recognized in the beetle an important creature. We need to point out that at that time the caves were not considered to be a suitable habitat for any animal or plant. Čeč somehow preserved the specimen and on the first occasion gave it to the count Franz Josef von Hohenwart (1771 – 1844), who was at that time preparing the first printed guide about Postojna cave. Hohenwart (Figure 1) was the initiator of the Natural History Collection of "Krainisches Landesmuseum" (Carniolian Regional museum) in Ljubljana (Slovenia) and president of its curatorium (ALJANČIČ, 1986).

He donated to the museum his own collection of fossils and stalagmites from the Postojna cave. At that time Carniola was a part of the Austro-Hungarian monarchy and the German language was in use in official documents. Due to the changes in the old German language rules, the count later wrote his name as Franz Hohenwart. That is important for the understanding of the later common misspelling of the beetle's name. Ho(c)henwart gave this unusual beetle specimen to the Carniolian famous entomologist Ferdinand Schmidt (1791 – 1878). Schmidt (Figure 2) was an expert on beetles and after a short study he recognized the beetle as a true cave animal, new to science and adapted to the cave environment.

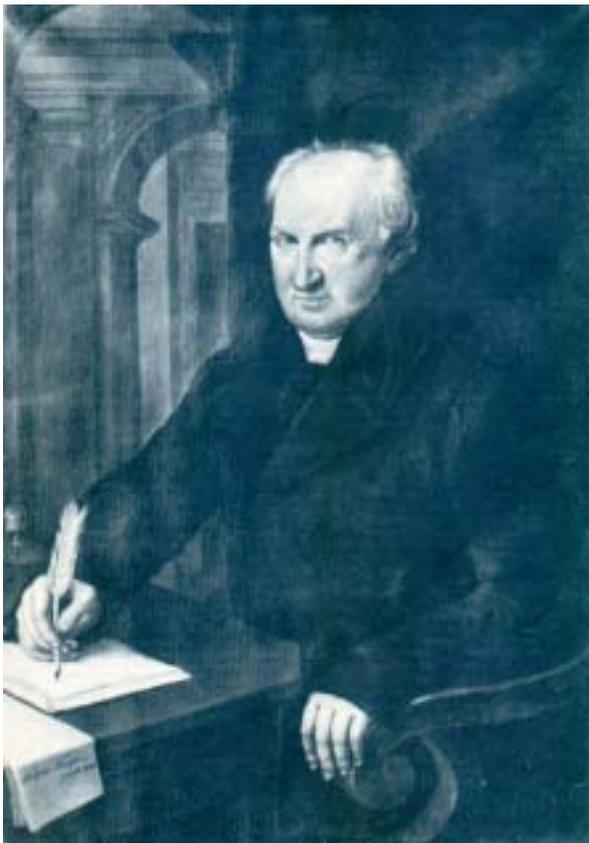


Figure 1: Franz Josef von Ho(c)henwart (1771 – 1844)

Figura 1: Franz Josef von Ho(c)henwart (1771 – 1844)



Figure 2: Ferdinand Schmidt (1791 – 1878)

Figura 2: Ferdinand Schmidt (1791 – 1878)



Figure 3: *Leptodirus hohenwartii* Schmidt, 1832

Figura 3: *Leptodirus hohenwartii* Schmidt, 1832

He did not only recognize the beetle as a new species but he also classified it as a new genus. In honour to the count Franz Ho(c)henwart the beetle got a scientific name *Leptodirus hohenwartii* (Figure 3). The very first description was published by Ferdinand Schmidt in the article under the name "**Beitrag zu Krain's Fauna**" (*Contribution to the fauna of Carniola*), which appeared in the Carniolian paper **Illyrisches Blatt**, on 21st January 1832 (Figure 4). Here is a part of the English translation of the original description that was written in the German language.

"Extreme luckiness and precise observation have led a famous and highborn count Franz Hohenwart, who is member of many learned societies and earned for natural history and a special friend of Entomology, to the discovery of a new species from the order of Coleoptera, that is on its finding place and extraordinariness excellent.

*Because of its specific, narrow part, this beetle is called **Leptodirus** (from **LEPTOS** – slender, **DEIROS** – neck) and in the sign of respect and memory of its discoverer, the adjective **Hohenwartii** is added and thus the beetle is called **Leptodirus Hohenwartii**, in German **Hohenwart's Enghalskäfer** and in Carniolan **Drobnovratnik**. It was found in the Postojna cave, on the mountain named Kalvarija in September last year by the Count and it was kindly given to me. Its length counts four and its abdomen width counts 1 fl "Linien". It is shiny red-brown in colour. The head, mouthparts and*

abdomen are similar to the carabid beetle of Cychrus genus. Articulated antennae are long, widened towards the apex and armed with hairy bristles. Pronotum is narrow, the same is the head. Elytrae are smooth, extremely spherical, convex and they do not cover only the upper part of abdomen but extend to the lower part and leave only a part of the body in the middle free. The elytrae are narrow towards the abdomen apex. The legs are long, similar to those of Carabid beetles (Carabus), five articulated and the tarsi armed with yellow-brownish hairs" On the end of description he added: *"I will present a more precise description for entomologists only on another occasion, in a special paper dedicated to this science."* (SCHMIDT, 1832a).

Ferdinand Schmidt, who has a Hungaro - Austrian origin was a kind sympathizer of the Carniolian people and even spoke local Slovene language (ALJANČIČ, 1991). Surprisingly enough, beside the description in the German language and the Latin scientific name, Schmidt added the Slovenian name "drobnovratnik", too. Drobnovratnik means slender-necked and is a translation from the Latin name. As you can see, the count Ho(c)henwart was mentioned as a discoverer of the *Leptodirus* and not the uneducated and at that time unimportant cave guide Luka Čeč. This injustice was present in the later literature, too and it occasionally appears even today, despite the fact that the curator of the Trieste Natural History museum, Heinrich Freyer, pointed to this error already in 1855.



Illyrisches Blatt.

Nr. 3.

Samstag

den 21. Jänner

1832.

M i e t e r

von

Hugo vom Schmaratbale.

1.

Im Wasser.

Im Helms' ich am schwellenden Bach,
Es spüht' mein Aug' einer Welle nach,
Sie murremt so freudig hin und her;
Noch schau' ich ihr nach, und seh' sie — nicht mehr.

Einmal war ich gar glücklich, ich klagte es nicht,
Noch fächte die Luft mir das Angesicht,
Doch wie die Welle schlüpfte davon,
So stob auch die Freuden all' entflohn.

Wohl kommen noch Welten sonder Ziel,
Der Luft hat das Leben stets neu und viel,
Doch weilt mir verdämmert das Morgenroth,
Nicht freut mich die Sonne; das Herz ist toth.

2.

Der Todte beim Gewetter

Am Hügel durchbläst des Nordes Hauch
Mit nachlichem Grimm die den Flederhauch.
Ich muß hinaus in des Lebens Gebiet,
In schauen, was über mir geschieht. —

Ein, da geht es ja zu ganz graufrohst!
Die Wetter ralen mit wüthender Kraft,

Und bestig aus eitendem Wolkendach
Stürzt Regen nieder; es schreilt der Bach.

Wie donnert stauwend des Himmels Gewalt,
Und doch ist es schaurig — kühler und kalt:
Die Gute selbst bleibt in ihrer Klust,
Aus der sie ihr ätzend Vieklein ruft.

Die Wende zerplittert, der Erdball kracht,
Bedauere dich, Wanderer! Gute Nacht!
Es wetter' und stürme, wie es will,
In meinem Haus ist es ruhig und still.

Beitrag zu Krain's Fauna.

Der besondern Güte und genauen Beobachtung
des als Beförderer der Naturkunde und Landkultur
eifrigst bekannten hochgebornen Herrn Franz Ge-
sen v. Spohnwart, k. k. Kämmerers, Präsidenten
der k. k. Landwirtschafts-Gesellschaft in Krain, und
mehrerer gelehrten Gesellschaften Mitgliedes, verdanke
die Naturgeschichte, besonders aber die Freunde der
Entomologie, einen neuen Zuwachs für die Erbauung
der Käfer (Coleoptera), der, durch den Zeit der Auf-
findung ausgezeichnet, zu den seltensten Naturpro-
ducten gezählt werden muß.

Dieser Käfer, wegen seines besonders verengten Hal-
ses *Leptodirus* (von *λεπτός* eng, und *δελος*
Hals), und zum ehrenden Andenken an den hohen Ent-
decker mit dem Beinamen *Wochenwart*, semit

Figure 4: The first description of *Leptodirus hohenwartii* was published in the magazine "Illyrisches Blatt", 21st, January 1832.

Figura 4: La primera descripció de *Leptodirus hohenwartii* va ser publicada a la revista "Illyrisches Blatt" el 21 de gener de 1832.

Soon after the first description, SCHMIDT (1832b) indeed prepared and published another similar description of the beetle in the Munich scientific paper Zeitschrift für Zoologie und vergleichende Anatomie.

Schmidt's description of *Leptodirus hohenwartii* is after the cave salamander *Proteus anguinus*, actually the description of the second true (troglobite) animal. It was the first description of a recognized cave animal with the clear statement of its adaptations to subterranean habitat. Furthermore, this discovery raised extremely high interest among the European naturalists of that time. Now we can say that not the discovery of the *Proteus*, but the discovery of a small beetle *Leptodirus* was a turning point that led to a new science. The story of unexpected findings of different cave fauna representatives was a result of certain coincidence.

The very first *Leptodirus* specimen, collected by Luka Čeč, which was studied by Schmidt to make his description, was partly damaged. Čeč probably damaged the fragile animal during the capture. Schmidt promised 25 Guldens (Austrian gold coins - florins) to

anyone who would find a second specimen. Čeč died in 1836 and the reward was never paid. Ferdinand Schmidt continued his search for a new *Leptodirus* specimen for another 16 years until he eventually found one in the Postojna cave in 1847 (SCHMIDT, 1847), practically on the same place. During his systematic search he discovered a whole range of other cave animals. He found strange eyeless and white crustaceans, spiders, millipedes and many other new beetles (ALJANČIČ, 1991). Schmidt was a specialist mainly on beetles and he did not scientifically describe the other new cave animals despite the fact that he put them in his famous collection and even gave them new names (Figure 5). He corresponded with quite some European scientists and many of them visited the Postojna cave in the years to follow. Among the first zoologists that visited Schmidt was Jorgen Christian Schiödte from the Danish (Denmark) capital Copenhagen (Kjöbenhavn). He came to Carniola and in company with Ferdinand Schmidt visited many Slovene caves in August 1845. Schiödte presented his findings to the Royal Danish



Figure 5: Detail from Ferdinand Schmidt's collection, now deposited in the Slovenian Museum of Natural History in Ljubljana, with marked type specimens of *Leptodirus hochenwartii*.

Figura 5: Detall de la col·lecció de Ferdinand Schmidt, actualment dipositada al Museu Eslovè d'Història Natural de Ljubljana, amb els espècimens destacats de *Leptodirus hochenwartii*.

Academy of Science at the meeting on the 25th June 1847 and the cave fauna sketch was published year later in the Academy's Proceedings (SCHIÖDTE, 1848). Next year SCHIÖDTE (1849) published a comprehensive study entitled "**Bidrag til den underjordiske Fauna**" (Contribution towards the Subterranean Fauna). He first described some new cave fauna, with excellent iconographic details. The same contribution and descriptions were translated by N. Wallich and written as Specimen Faunae Subterraneae for the Society of London in January 6th 1851.

In his speech and descriptions he wrote:

"I was determined, therefore, to arrange my plans in such a way, that I might connect my tour to the Alps with a visit to the caves in Carniola, and accordingly I selected the eastern portion of the Alps for my research. After remaining there during the summer of 1845, I arrived at Adelsberg (Postojna) in the early autumn. I examined four caves; namely, that of Adelsberg, the Magdalena and Luege caves, all in the neighbourhood of Adelsberg. The result was, first, that I found every sin-

gle animal, known before as inhabitants of those caves; second, that I discovered more than twice as many new kinds, among which there were five types of new genera; and finally, I discovered a part of the subterranean Fauna hitherto almost unknown. I believe I can offer materials for a systematic inquiry into the whole phenomenon." (SCHIÖDTE, 1851).

In addition to his speech he described a new genus of a tiny cave beetle *Bathyscia* from the Silphidae family (now Leiodidae = Cholevidae). Within this genus he described two new species *B. byssina* and *B. montana*. The short description of these tiny beetles is followed by four pages of the discussion about a strange new beetle from the (Adelsberg) Postojna cave. He described a new genus and new species ***Stagobius troglodytes*** (Figure 6).

Here is a short citation from his description: "The connate swollen and bladder-formed elytra from a curious contrast with the blind, long, narrow and depressed head and the equally long, narrow, almost cylindrical prothorax, and the slender and elongate shape of the

limbs Antenae 11-joined, clavate...” He was unable to put the beetle in any known family and therefore he described a new subfamily Stagobiinae.

In the same paper Schiödte described some other troglobite invertebrates new to the science. He described the first cave collembolan *Anurophorus stillicidi*, the first cave spider *Stalita taenaria*, the first cave pseudoscorpion *Blothrus spelaeus*, the first cave amphipod *Niphargus stygius* and the first cave isopod *Titanethes albus*. All the descriptions of the new species were accompanied by the fine, precise drawings and the important details concerning taxonomy. At the end of his speech he proposed the first division of the inhabitants of caverns: These are Shade-animals, Twilight - animals, Cave - animals and Stalactite - cave animals.

It is clear, that *Stagobius troglodytes* is the same animal as Schmidts *Leptodirus hohenwartii*. In his first papers (SCHIÖDTE, 1848, 1849) he was convinced in the correctness of his descriptions, but at the end of English translation of his speech in London (1851), translator Dr. N. Wallich added an important sentence as an “Appendix to the above Memoir”, that indicates Schiödtes doubt. The following observations have been communicated by the author, in a letter to Dr. Wallich:

“Through the kindness of Mr. Ferdinand Schmidt I have since become acquainted with quarto paper, published by him (as it appears, a transcript from Illyrian daily paper), entitled *Naturhistorisches aus Krain (Communications on Natural History, from Carniola)*, and dated 28th December 1847; in which that zealous and, as respects the Fauna of caves, very meritorious collector, gives an account of several new objects found there. A new Anophthalmus, from the Sele grotto, has now appeared in Sturm’s “*Deutschlands Fauna*” under the name A. Bilimeki (named after the discoverer, a Cistercian divine). Two other animals likewise mentioned here; Catops troglodytes and Obisium troglodytes, are probably identical with Bathyscia byssina and Blothrus spelaeus. Mr. Schmidt has likewise found Stagobius troglodytes in the Adelsberg grotto, referring it under the name of Leptodirus Hohenwarti, represented in an annexed lithographic outline. It is mentioned at the same time, that fragments of the animal had already been found in 1831, by Count Franz von Hohenwart, but that Mr. Schmidt had visited the caves annually, from 1831 to 1846, on purpose to search for it, but in vain. Sturm has now given a good account of this cave inhabitant in his “*Deutschlands Fauna*”, but appears not to have been acquainted with my memoir. (Comparing his and Schmidts description he noticed :) *The anterior tarsi of the male are five-joined, according to his account; so that my specimens must be all females, and those points, to which I thought I could attach external sexual differences, can only belong to individuals.*”

Here we can see that both, Schiödte and Schmidt described the same species under different names. According to the International Code of Zoological Nomenclature, the validation of the first scientific description is accepted, so Schmidt’s description of *Leptodirus hohenwartii* (SCHMIDT, 1832a) has a priority over Schiödte’s *Stagobius troglodytes* (SCHIÖDTE, 1848). It is hard to believe, that Schiödte did not know

for Schmidt’s earlier findings of cave beetles. Schmidt led Schiödte on his visits to the Carniolian caves as early as 1845, and it seems that only the STURM (1849) citation in *Deutschlands Insecten Fauna* with the validations of Schmidt’s descriptions of *Leptodirus hohenwartii* and a clear lithographic outline convinced Schiödte to take Schmidt’s papers into serious account.

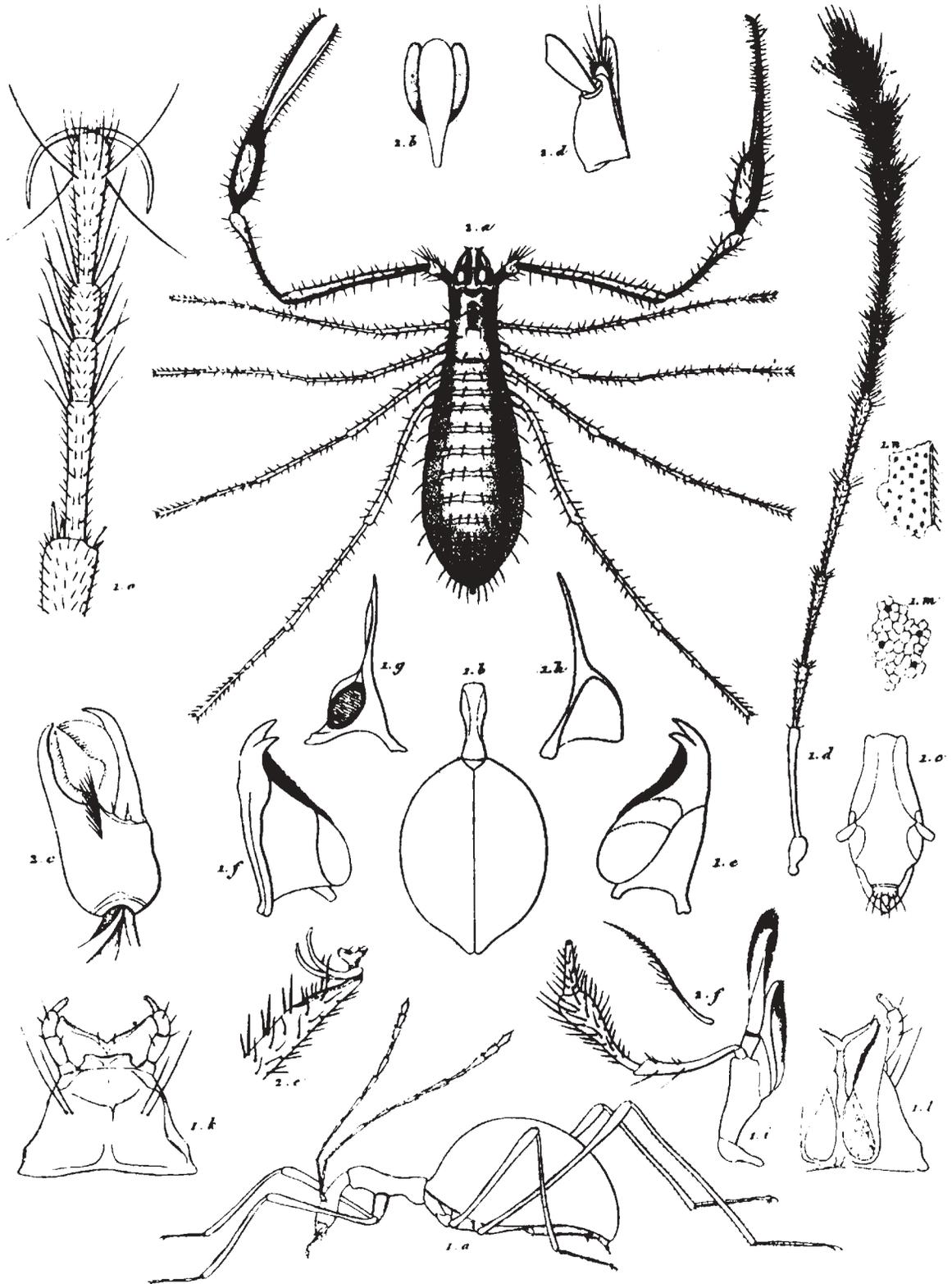
Nevertheless, the discovery of a reach cave fauna in the Postojna cave attracted many European scientists and naturalists to visit it. It was visited by Victor Motschulsky from Russia, H. Schaum, J. Sturm and G. Joseph from Germany, R. Khevenhüller – Metch and J. H. Schiner from the Austrian monarchy. A sort of race started to be the first to describe the new cave taxons. Ferdinand Schmidt collected most of the species as a first collector, but he was too cautious and many species placed in his collection were not scientifically described.

Beside a well known *Leptodirus hohenwartii*, he found: a new pterostichine beetle in 1832 that was later, in 1846 described as *Laemostenus schreibersi* by Heinrich Carl Kuster. Schmidt had in his collection the cave cricket *Troglophilus cavicola* described later in 1833 by D. Kollar, the cave pseudoscorpion named *Obisium troglodytes* (described as *Blothrus spelaeus* by Schiödte in 1948) than the cave woodlice - isopod crustacean *Titanethes albus* and the cave amphipode *Niphargus*. Last four species were scientifically described by Schiödte in 1848 on the basis of specimens collected by himself in August 1845.

In 1852 Leon MILLER described the new species of the cave beetle *Bathysciotes khevenhuelleri* collected by R. Khevenhüller in the Postojna cave. This species was known, but not described by Henrich Freyer in 1833 and by Schmidt in 1847 either (PRETNER, 1968a). In 1835 E.A. Rossmäessler visited the Postojna cave. He took some stalagmites for souvenir and on the daylight he found approximately 20 tiny snail shells on them. He wondered if the empty shells could have been the fossils, but nevertheless he described the species as *Carichium spelaeum* in 1837. The species that later changed its genus name to *Zospeum* is actually the first known and described cave snail. Now we know 20 species of such cave snails in the genus dispersed in the caves from the Pyrenees to the southern Balkan. Half of the species live in Slovenia, the centre of the distribution of *Zospeum* genus (BOLE, 1974).

In 1854 Rudolf Ignaz Schiner and Johann Georg Egger found the first cave fly *Phora aptina*. SCHINER (1854) in its contribution to the Cave fauna of Postojna, Predjama and Magdalena jama (Figure 7), all around Postojna gave the additional division of the inhabitants of caverns to the troglaphiles, troglroxenes and troglobites, which is more or less valid even today. In 1855 Camill Heller gave the first description of the cave millipede *Brachydesmus subterraneus* and in 1880 R. Latzel described the cave centipede *Lithobius stygius* and in 1884 another two milipede *Acherosoma troglodytes* and *Attemsia stygium* all from the Postojna cave (PRETNER, 1968a).

Without any doubt we can say that the Postojna cave, where the first cave representatives of the most invertebrate groups were found and described as ‘Type locality’, was and remains a true biological Mecca.



1. *Stagobius troglodytes* — 2. *Blothrus spelæus*

Aster del. et sc.

Figure 6: Iconography annexed to the original description of the *Stagobius troglodytes* published in "Bidrag til den underjordiske Fauna", 1849.

Figura 6: Iconografia que apareix junt amb la descripció original de *Stagobius troglodytes*, publicada a "Bidrag til den underjordiske Fauna", 1849.

Later, the rich cave fauna was found in the Carpathians, Alps, Apennines and Pyrenees as well as on the other Continents, especially in the United States of America. But nevertheless, the Postojna cave remains the birth place or the cradle of a new biological science, the biospeleology or speleobiology (Biospéologie in French). The Postojna cave is not famous only as the type locality of the first representatives of many cave animal groups but also as the absolute record-holder in the number of troglobite species. Today we list 86 species of the troglobites of the Postojna-Planina cave system, 2 more than were known in 2000 (CULVER & SKET). This cave is, respecting number of known troglobites, the richest cave on the world, followed by the Vjetrenica cave in Bosnia and Herzegovina and Romanian Peștera de la Movile cave on the third place.

Present status, distribution and conservation of *Leptodirus hochenwartii*

Let us return to the main object of this paper the *Leptodirus hochenwartii* beetle. Due to the fact that it is the first described cave beetle, the nomenclature mess is to be expected. The first synonym for *Leptodirus* is the already mentioned Schiodte's *Stagobius troglodytes*. In his later papers (1852), Ferdinand SCHMIDT used different spellings as *Leptoderus*, instead *Leptodirus*, which sporadically occur even a century later. There are some later spellings of the *hochenwartii* in literature, too as *hochenwarti* or *hohenwarti*. The different spelling of the name of this beetle is present in the serious scientific papers even today. Respecting the International Code of Zoological Nomenclature we propose the use of the first written name in *Illyrisches Blatt* by Schmidt published in January 21st 1832 of *Leptodirus hochenwartii* as a valid name. The first description was published in the daily paper, appointing the scientific Latin name and giving the description of the animal, good enough to be accepted as original scientific description. In the recent revision and classification (NEWTON, 1998) the validation of the first used name *Leptodirus hochenwartii* is accepted as well.

Today only one species of genus *Leptodirus* with 6 subspecies is officially recognized. The subspecies described by Schmidt with type locality in the Postojna cave are endemic to the Notranjska karst. In 1856 the Russian entomologist Victor MOTSCHULSKY described a new species *Leptodirus schmidtii* from Velika jama near Trebnje in south-eastern Slovenia. This species was later recognized as a variety by Edmund Reitter and as subspecies by Ludwig Ganglbauer, Rene JEANNEL (1924) and Egon PRETNER (1955, 1968b). In 1905 Josef MÜLLER described a new subspecies *Leptodirus hochenwarti reticulatus* from Grota Noe near Trieste in Italy. Six years later Arturo SCHATZMAYR (1911) described a new notable slender forma *Leptodirus h. r. ab. bachofeni* named after Vienna Baron von Bachofen. The taxonomic status of

this aberrant form as well as earlier described forms *L. h. ab. deschmanni* (JOSEPH, 1872) and *L. h. ab. grouvelli* (JEANNEL, 1910) is not clear. The *Leptodirus* specimens that were in 1911 found by V. Stiller in Croatian Lednica cave near Lokve in Gorski Kotar, were later described by Egon PRETNER (1955) as a new subspecies *L. h. croaticus*. In 1926 Giuseppe (Josef) MÜLLER described the specimens from Čičarija in Istria as a new variety *L. h. subsp. reticulatus var pretneri*. Pretner later gave a status of subspecies *L. h. pretneri* to this type of specimens. For half a century that followed, the distribution of *Leptodirus hochenwartii* was known as a typical Carniola or north Dinaric endemite which could not be found beyond the Dinaric region in Slovenia or south of the line Zagreb – Krk in north Croatia. This line should have been the border of the so cold Carniola cave fauna (JEANNEL, 1911). Surprisingly enough in June 1965 Egon Pretner found *Leptodirus* specimens more than 100 km to the south in southern Velebit Mountains. Those specimens were recognised and described as a new subspecies *Leptodirus hochenwartii velebiticus* (PRETNER, 1970).

As we can see the *Leptodirus hochenwartii* with its 6 known subspecies is one of the most widespread species of the cave leptodirine beetles with typical North-West Dinaric distribution (POLAK, 2002). It is the first discovered and described cave beetle. Due to its extremely troglomorphic and strange appearance it is therefore the most famous cave beetle in the world. Beside the famous olm or human fish as named by local people, the cave salamander *Proteus anguinus*, this cave beetle is becoming more and more popular animal and in Slovenia its image is the base for an emblem of Slovenian entomological society as well as for the magazine *Acta entomologica Slovenica* (Figure 8). *Leptodirus* found its place even on the Slovenian postcards. In the Postojna cave, a century-old idea was realised in April 2003 when speleobiological exhibition, laboratory and vivarium of cave animals was restored. In the cave vivarium that contain some live specimens of cave fauna from Postojna cave, the cave beetle *Leptodirus hochenwartii* is presented to the wider public not only to the biologists and cavers.

As a troglobiont and a strictly endemic animal the *Leptodirus* is threatened by illegal and massive collecting and indirectly by destruction and pollution of the caves. As the filtrates of the percolating and dripping water are deposited on the stalactites and cave sinter walls, any pollution on the surface can have significant influence on these cave inhabitants beneath the surface. Therefore *Leptodirus hochenwartii* is protected in Slovenia as a species and its collecting needs official permission. But official species protection did not ban the potential threat to species due to the habitat destruction or pollution. In the process of the last enlargement of the European Union with 10 new members, Republic of Slovenia proposed *Leptodirus hochenwartii* (under the name *L. hochenwarti*) to be listed on the Annexes II, IV (addition of species) of the EU Habitat directive (SKOBERNE, 2002). The EU Council Directive (92/43/EEC) on the conservation of the natural habitats and of the wild fauna and flora has a list of animal and plant species of community interest whose con-

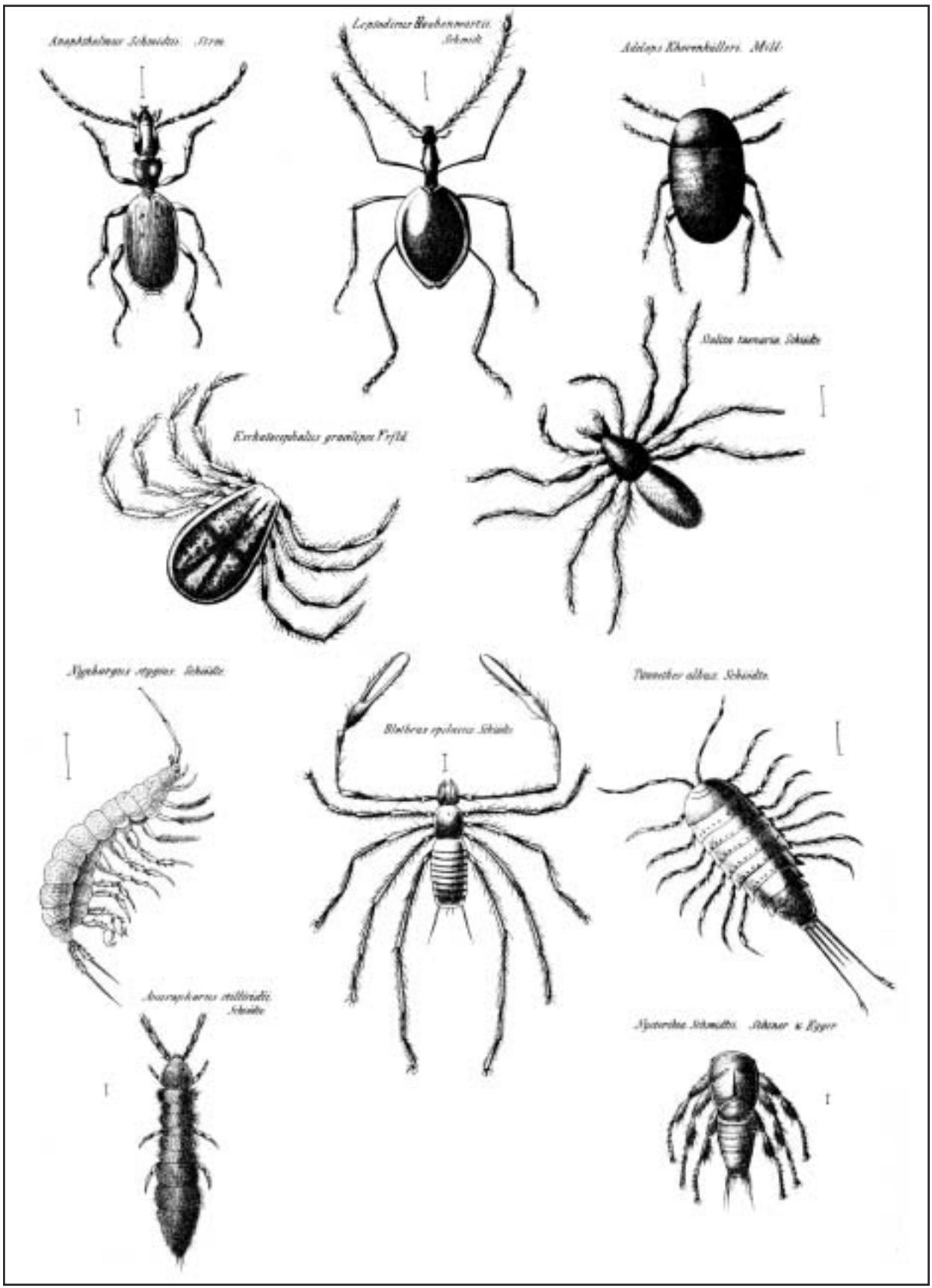


Figure 7: Iconography of the first known cave fauna. From SCHINER, J.R. 1854: Fauna der Adelsberger -, Lueger- und Magdalenen Grotte. (Apud Schmidl A., Die Grotten und Hohlen von Adelsberg, Lueg, Planina und Laas, Wien).

Figura 7: Iconografia de la primera fauna cavernícola que va ser estudiada al món. Correspon a la publicació de SCHINER, J.R. 1854: Fauna der Adelsberger -, Lueger- und Magdalenen Grotte. (Apud Schmidl A., Die Grotten und Hohlen von Adelsberg, Lueg, Planina und Laas, Wien).

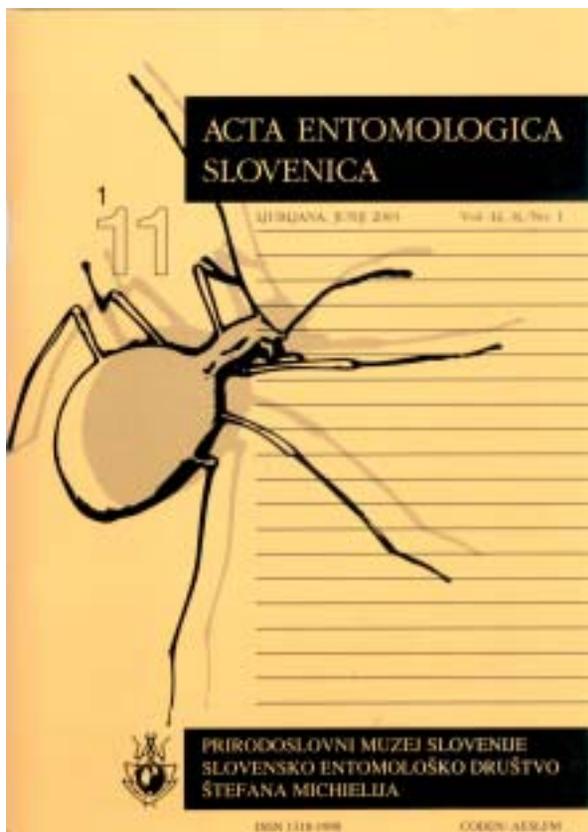


Figure 8: The cave beetle *Leptodirus hochenwartii* is the base for an emblem of Slovenian entomological society as well as for the magazine *Acta entomologica Slovenica*.

Figura 8: L'escarabat cavernícola *Leptodirus hochenwartii* constitueix l'element gràfic bàsic de l'emblema de la Societat Entomològica Eslovena i de la revista científica *Acta entomologica Slovenica*.

ervation requires the designation of Special Areas of Conservation. Each member state has to identify and protect the network of special conservation areas for listed habitats, plant and animal species. Significant areas, designated specially for conservation of this famous tiny beetle have been proposed for protection in Slovenia and designated since 1st May 2004 as a part of a Natura 2000 site protection network.

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References

- ALJANČIČ, M. (1986): Grofov(s)ko povabilo v ljubljanski Deželni muzej. *Proteus* 48: 250-253.
- ALJANČIČ, M. (1991): Kovač (Faber ferrarius) iz šiške. *Proteus* 54: 58-64.
- ALJANČIČ, M., B. BULOG, A. KRANJC, P. HABIČ, D. JOSIPOVIČ, B. SKET & P. SKOBERNE (1993): *Proteus, the mysterious ruler of Karst darkness*. Vitrum d.o.o., Ljubljana.
- BOLE, J. (1974): Rod *Zospeum* Bourguignat 1956 (Gastropoda, Ellobiidae) v Jugoslaviji. *Razprave IV. Raz. SAZU* 17 (5): 249-291, Ljubljana.
- CULVER, C. D. & B. SKET (2000): Hotspots of Subterranean Biodiversity in Caves and Wells. *Journal of Cave and Karst Studies*, 62 (1): 11-17.
- JEANNEL, R. (1910): Un nouveau *Leptodirus* des grottes de Carinthie. *Bulletin de la Societe Entomologique de France*, 29-33.
- JEANNEL, R. (1911): Revision des Bathysciinae. *Biospeologica XIX*. - *Arch. Zool. expér. gener.*, (5) 7: 1 - 641, Paris.
- JEANNEL, R. (1924): Monographie des Bathysciinae. *Biospeologica L. Archives de Zoologie Experimentale et Generale*, 63: 1- 436.
- JOSEPH, G. (1872): Beobachtungen über die Lebensweise und Vorkommen der in den Krainer Gebirgsgrotten einheimischen Arten der blinden Gattungen *Machaerites*, *Leptodirus*, *Oryotus* und *Troglorrhynchus*. - *L. c.*, 49 (1871). 171-182.
- MILLER, L. (1852): *Adelops khevenhülleri*, n. sp. *Verh. zool. - Ver. Wien*, 1: 131 - 132, Wien.
- MOTSCHULSKY, V. (1856): Voyages: Lettres de M. de Motschulsky a M. Menetries. No. 4. (*Etudes entomologiques*, V. 21-38).
- MÜLLER, J. (1905): Vier neue Höhlenkäfer aus dem osterr. Litorale. *Wien. Ent. Zeitg.* XXIV, 32.
- MÜLLER, G. (1926): Nuove osservazione su alcuni coleotteri cavernicoli del Carso triestino e istriano. *Boll. Soc. Adriat. Sci. Natur., Trieste*, 29 (I. Memorie): 143 - 148, Trieste.
- NEWTON, A.F. (1998): *Phylogenetic problems, current classification and generic catalog of world Leiodidae (including Cholevidae)*. In: Giachino P.M. & Peck S.B. (eds.): *Phylogeny and evolution of subterranean and endogean Cholevidae (= Leiodidae Choleviniae)*. Proc. XX I.C.E., Firenze. ATTI Mus. Reg. Sci. Nat., Torino pp. 41-178.
- POLAK, S. (2002): *New confirmations of the common North-West Dinaric troglolitic Leptodirinae fauna (Coleoptera, Cholevidae)*. XVI International Symposium of Biospeleology, Verona, Italy 8-15 September 2002, Museo Civico di Storia Naturale di Verona.
- PRETNER, E. (1955): Rodovi *Oryotus* L. Miller, *Pretneria* G. Müller, *Astagobius* Reitter in *Leptodirus* Schmidt (Coleoptera). *Acta Carsologica SAZU*, Ljubljana, 1: 43 - 71.
- PRETNER, E. (1968a): *Zivalstvo Postojnske jame. - Die Fauna der Höhle von Postojna. - 150 let Postojnske jame, 1818 - 1968 (založila Postojnska jama)*, str. 59 - 78, sl. 1 - 9.
- PRETNER, E. (1968b): Coleoptera. Fam. Catopidae. Subfam. Bathysciinae. *Catalogus Faunae Jugoslaviae*, 3 (4), 59 pp.
- PRETNER, E. (1970): *Leptodirus hochenwartii velebiticus* ssp.n. in *Astagobius hadzii* sp.n. z Velebita, *Astagobius angustatus deelemani* ssp.n. in *Astagobius angustatus driolii* ssp.n. iz Like (Coleoptera). *Acta Carsologica*, poročila V/9. SAZU, Ljubljana.
- SCHATZMAYR, A. (1911): Una nuova forma del *Leptoderus Hohenwartii*. *Boll. Soc. Adriat. Sc. Nat. Trieste*, 1910, parte II, III. Resoconto della Sezione entomol., 63-65, sep. 1-3.
- SCHIÖDTE, J. C. (1848): Undersögelser over den underjordiske Fauna i Hulerne i Krain og Istrien. *Oversigt ov. Danske Vidensk. Selskabs Forhandlinger (annus 1847)*, 75 - 81, Kjöbenhavn.
- SCHIÖDTE, J. C. (1849): Bidrag til den underjordiske Fauna. (Specimen faunae subterraneae). *Afhandl. Dansk. Vidensk. Selsk.* (5) 2: 1 - 39 tab. 1 - 4, Kjöbenhavn.
- SCHIÖDTE, J. C. (1851): Specimen Faunae Subterraneae. *Trans. Entomological Society of London*. Translated by N. Walich, N.S. vol 1, (4) & (5).
- SCHINER, J.R. (1854): *Fauna der Adelsberger-, Lueger- und Magdalenen Grotte. (Apud Schmidl A., Die Grotten un Hohlen von Adelsberg, Lueg, Planina und Laas)*, Wien, 231-272.
- SCHMIDT, F., (1832a): Beitrag zu Krain's Fauna. *Leptodirus Hohenwartii*, n. g., n. sp. *Illyrisches Blatt.*, Nr. 3 vom 21. Jänner 1832: 9-10, Laibach.
- SCHMIDT, F. (1832b): *Leptodirus Hohenwartii* und Elater Grafii. In: *Gistl. J. (ed.)*, (Faunus: Zeitschrift für Zoologie und vergleichende Anatomie. Vol. 1. (pp. 83-84). - M. Lindauer, München.
- SCHMIDT, F. (1847): Naturhistorischen aus Krain (*Leptodirus Hohenwartii*). *Illyrisches Blatt*, vom 28. Dezember 1847, Laibach.
- SCHMIDT, F. (1852): Zwei neue Arten von *Leptoderus*. - *Stett. ent. Ztg.*, 13: 381 - 382, Stettin.
- STURM, J. H. C. F. (1849): *Leptodirus*. Halswalzenkäfer. Gattung der Familie der Scydmaenides. *Deutschlands Insecten*, 20: 91 - 100.
- SKOBERNE, P. (2002): Slovenija, Evropska unija in varstvo narave. *Proteus*, 64, 7: 320-325.