

## Current situation and Pleistocene, Holocene, and historic records of *Emys orbicularis* in the Czech Republic

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During the Quaternary, *Emys orbicularis* invaded the area of the Czech Republic at least twice. The first proven colonization occurred during the Cromer (Günz/Mindel) interglacial of the Lower Pleistocene. The oldest postglacial records are of Mesolithic age (early Holocene) for Bohemia and of Neolithic age (middle Holocene) for southern Moravia. Most findings were made in later Neolithic to early Eneolithic sites, and sites of the Bronze Age, and the Germanic or Slavonic era. The youngest archaeological record is from the medieval locality of Šakvice in southern Moravia. The gap between the oldest literature record (1603) and youngest archaeological finding is less than 400 years. Based on archaeological findings and literature records, a continuous occurrence of *E. orbicularis* in the territory of today's Czech Republic is likely from the early Holocene until historic times. All recent attempts to find in the Czech Republic surviving native relict populations have failed.

Key words: *Emys orbicularis*, Quaternary distribution, archaeology, Czech Republic.

### Introduction

The European pond turtle, *Emys orbicularis* (L., 1758), is a widely distributed species, living on three continents (FRITZ, 1998). Rapid growth of the human population, urbanization, and development of intensive agriculture and industry during the last century caused the pond turtle to retreat from a huge part of its former range. This process is most evident in the developed countries of West and Central Europe, where the distribution was already discontinuous before this decline.

The natural occurrence of *E. orbicularis* in the Czech Republic has long been a topic of debate. Doubts have been raised about the autochthony of any recent records because the turtles were subject of trade for centuries, formerly as food item during Lent (ZÁLESKÝ, 1922), and later as pet. The current absence of *E. orbicularis* in the Czech Republic is the result of a synergistic effect of suboptimal climate and disturbances by man, as in other parts of Central Europe (FRITZ, 1998). Alterations of wetlands (river regulations, drainage of floodplains) and pollution of surface-

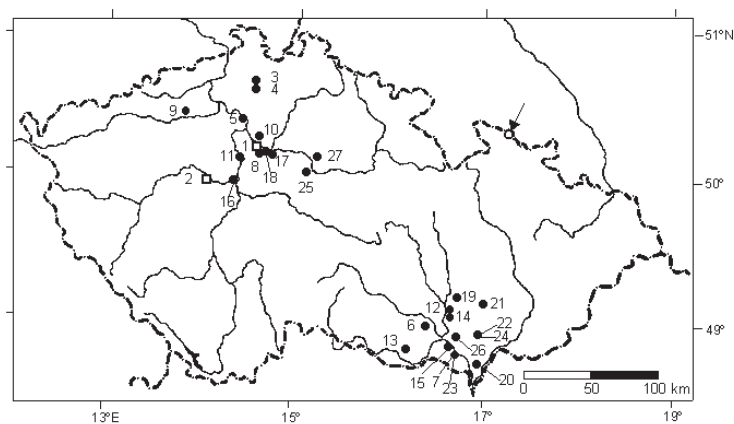


Fig. 1. *Emys orbicularis* findings and records in the Czech Republic. Open squares: Pleistocene; black circles: Holocene; open circle with arrow: Vidnavské mokřiny Natural Reserve. The numbers correspond to Table 1.

water in fertile lowlands can be considered as the main reasons for the further retreat of the species in the Czech Republic. Currently there are only two areas which could still harbour native turtles: the lowlands of southern Moravia and the borderland of Silesia (ŠIROKÝ, 2000).

This study aims to document the prehistoric, historic, and current distribution of the European pond turtle in the Czech Republic.

#### Material and methods

Information was gained from literature sources, museum collections, archives of the Institute of Archaeology of the Academy of Sciences of the Czech Republic, and field research. Data were divided into the following two categories: Turtle findings from archaeological excavations were attributed to the category Ancient distribution. Data covering the period since the first literature record to the present time were summarized as Historic distribution (ŠIROKÝ, 2000).

The age of the Ancient records were determined from relevant publications or unpublished excavation reports, together with important parameters such as cultural stratum, parallel findings, and exact location. A lot of information was obtained by mail requests or by personal communication with archaeologists. Holocene data were filed according to the age. This enables us to determine chronological differences in abundance of turtle findings. As the Pleistocene age covers a much longer period with fewer records, the older Quaternary discoveries were not arranged chronologically.

In areas where the existence of native turtles was thought to be still possible, we started a monitoring programme in 1996. We collected for the Czech Republic all available data about turtle sightings and tried to verify them. Moreover, 12 baited traps were used during 23 days (May and June 2001) for a thorough survey of the Natural Reserve of Vidnavské mokřiny (wetlands of Vidnava) in Czech Silesia (50°22.5' N, 17°11.9' E). Pieces of two-day-old beef heart were used as bait.

#### Results

##### Ancient distribution

We obtained data on turtle findings from 27 archaeological sites (Tab. 1). Earlier Quaternary findings of the European pond turtle from the Pleistocene of the Czech Republic are limited to two localities from Central Bohemia. These turtles have been dated to the Cromer (Günz/Mindel) interglacial (ZÁVORKA, 1938; ULLRICH & MEYNARSKI, 1978), approximately 800,000–600,000 years before the present. Up to now, there are no Pleistocene turtle localities known from the Moravian lowlands.

A similar situation emerges for early Holocene (Mesolithic) records. All findings from the Mesolithic are located in northwestern Bohemia. Younger localities, starting with Neolithic age, are distributed both in the southern Moravian lowlands and in the Bohemian depression (Fig. 1). Their chronological distribution (Fig. 2) demonstrates that turtles were most frequently discovered in the later Neolithic or early Eneolithic sites (4000–3000 B.C.), in Bronze Age excavations (1900–700 B.C.), and excavations from the Germanic or Slavonic eras (200–1000 A.C.). Although some short time gaps are present, the occurrence of *Emys orbicularis* in prehistoric times seems to be continuous since the Mesolithic period. The youngest archaeological turtle findings in Bohemia date from the end of the first millennium after Christ (in the Czech Republic called Slavonic era), while in Moravia they come from the Middle Ages (13<sup>th</sup> or the beginning of 14<sup>th</sup> century).

##### Historic distribution

The first literature record for the occurrence of turtles in the current Czech Republic was

Table 1. Archaeological findings of *Emys orbicularis* in the Czech Republic.

No.	Locality	Exact location	Age of finding	References
1	Přezletice	Zlatý kopec	Cromer interglacial	ZAZVORKA (1938)
2	Koněprusy	Zlatý kůň, cave C 718	Cromer interglacial	ZAZVORKA (1957); MLYNARSKI (1964)
3	Dřevčice	Abri Máselník I (Butterberg)	Mesolithic	PEŠA (1998); SVOBODA (1998)
4	Zátyní	North edge of village, 4 km NW of Dubá	Mesolithic, late Tarde-noisian	PROŠEK & LOŽEK (1952)
5	Dolní Beřkovice	Feature No. 480 SP	Stroke ceramic culture	To the site: RAKOVSKÝ (1978)
6	Jezeřany-Maršovice	Na kocourkách	Lengyel culture	
7	Lednice	Hole at Lengyel settlement	Lengyel culture	FREISING (1931); SKUTIL (1935)
8	Jenštejn	Domov důchodců, feature No. 105	Early Eneolithic phase	BEECH (1995)
9	Dobroměřice	Feature No. 1/72	Funnel beaker culture	SMRŽ (1975)
10	Mlékojedy	Na vrších	Baden culture	To the site: MOTYKOVÁ & ZAPOTOCKÝ (2002)
11	Praha-Bubeneč	Cemetery	Únětice culture	PETRBOK (1933)
12	Rebešovice	Grave No. 10	Únětice culture	ONDRÁČEK (1962)
13	Borotice	From rampart of barrow 27	Věteřov group (approx. 1500 B.C.)	To the site: STUHLÍK (1991)
14	Blučina	Cezavy	Early or late Bronze Age (not middle)	SKUTIL (1960)
15	Bulhary	Found superficially	Early or late Bronze Age (not middle)	To the site: STUHLÍK (1977)
16	Lipence	Hole 8	Knovíz culture	KYSELÝ (2002)
17	Čelákovice	Engelsovy domy, feature No. 6/76	Štítary/Silesian Platěnice culture	
18	Ostrov	Near Zápy	Štítary/Silesian Platěnice culture	SKUTIL (1935)
19	Horákov	Hole near Horákov into direction of Velatice	Hallstatt Age	
20	Lanzhot	Podsedky, feature 6	Hallstatt Age	To the site: PEŠKA & RAKOVSKÝ (1987)
21	Vícemilice	Plot No. 1091, square No. 11, western fireplace	Roman Age	SKUTIL (1935)
22	Čejč	At railway	Germanic settlement	
23	Lednice	No details	Germanic or Slavonic Age	SKUTIL (1949)
24	Čejč	Slavonic barrow	700-800 A.C.	SKUTIL (1960)
25	Kouřim	Sv. Kliment	Second half of 10th century	PEŠKE (1985)
26	Šakvice	Štěpničky	13th or beginning of 14th century	PEŠKE (1981)
27	Libice nad Cidlinou	No details	Holocene	NEČAS et al. (1997)

published in the year 1603. The Czech chronicler BREZAN described the transport of turtles from southern Moravia to southern Bohemia (ZÁLESKÝ, 1925). The second person, who discussed the occurrence of turtles in some Mora-

vian ponds, was PEŠINA Z ČECHORODU (1677). After his work, a long period follows with few records. Some exceptional notes from the 18<sup>th</sup> and 19<sup>th</sup> century provide information about occurrence and keeping imported *E. orbicularis* in southern

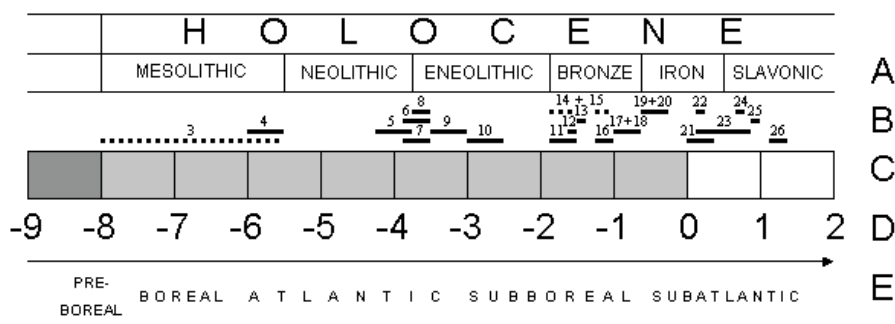


Fig. 2. Chronological distribution of Holocene archaeological findings of *Emys orbicularis*. (A) archaeological era; (B) time distribution of turtle findings, broken lines refer to findings with inexact dating; (C) scale; (D) timing in thousands of years; (E) palaeoclimatological partition.

Bohemia (reviewed by ZÁLESKÝ, 1922). Another wave of records starts in the 19<sup>th</sup> century with its peak during the first three decades of 20<sup>th</sup> century. Further sightings follow the Second World War, but these are rarer (ŠIROKÝ, 2000).

Our monitoring programme of selected localities yielded only one new record. The shell of an adult male was found by the senior author in September 2000 in the Natural Reserve of Vidnavské mokřiny (ŠIROKÝ, 2001). But subsequent exploration of this locality in spring 2001 did not reveal any other turtles. Moreover, we discovered that the specimen in the Šumperk museum collection, mentioned as *E. orbicularis* from Vidnava (BENEŠ & HUDEČEK, 1992), was determined erroneously. In fact, it is a young slider, *Trachemys scripta* (Schoepff, 1792). Further, the local inhabitants of Vidnava, formerly quite familiar with turtles, have not provided any new records in recent years. It seems that *E. orbicularis* has definitely disappeared at this locality (Fig. 1). New records of turtle sightings provided by anglers and other reliable persons concentrate in southern Moravia, along the rivers Dyje (Thaya) and Morava (March), between Lednice, Lanžhot and Hodonín. However, these records have not been confirmed yet.

## Discussion

According to our data, there is no doubt that *Emys orbicularis* once occurred naturally in the Czech Republic. This contradicts ŠTĚPÁNEK (1949) who questioned that turtles from Czech archaeological sites represent native individuals. He thought that all turtle remains were liturgical tools or decorative articles, and supposed that these

were imported from somewhere in Southeast Europe. However, as archaeological turtle remains are quite numerous, this is not convincing. Moreover, many turtle findings were not modified by man and some were found associated by chance with cultural layers.

The age of the oldest records of *E. orbicularis* in the Czech Republic corresponds to other Pleistocene findings in Central Europe (ULLRICH & MLYNARSKI, 1978; FRITZ, 1995). The Pleistocene is characterized by more or less regularly alternating cold glacial periods and warmer interglacial periods (LOŽEK, 1973). Both Czech findings fall into the Cromer (Günz/Mindel) interglacial, which belongs to the earlier part of these temperature oscillations. In contrast to Germany or Slovakia (ULLRICH & MLYNARSKI, 1978; FRITZ, 1995), there are no records from later interglacials. Perhaps this reflects a distribution gap during these periods in the Czech Republic. However, southern Moravia communicates via river valleys with the Pannonian lowlands, and colonization from there seems likely for all interglacials. Thus, a more probable explanation is that archaeological sites of the appropriate ages are simply lacking.

After the last glacial, in the Holocene, European pond turtles recolonized what is now known as Czech Republic, as evinced by subfossil findings. Postglacial discoveries were unearthed in both of the warmest areas of the Czech Republic, the Bohemian depression and the southern Moravian lowlands. Turtles inhabited the Bohemian depression at least since Mesolithic times, whereas the oldest known findings in southern Moravia are from Neolithic sites. The early Holocene was characterized by increasing temperature and humidity, leading to a reforestation of a pristine steppe and

forest-steppe landscape. Human impact to landscape was negligible in the early Holocene, due to low population density and the mode of life as hunter and gatherer. However, in the Neolithic (middle Holocene), in part of the Czech Republic primitive agriculture and settlements developed, leading to local deforestation. Such clearings favoured the survival of many steppe elements in Central Europe (e. g. molluscs: LOŽEK, 1981). Thus, in spite of many negative impacts, some human activities may have facilitated the local survival of turtles in Central Europe until the recent past. However, with the rapidly growing local human population, negative impacts, like hunting of turtles for food and habitat destruction, overrode the positive effects (FRITZ, 1996, 2003).

The use of turtles for food possibly reached a peak from the Middle Ages until the 18<sup>th</sup> century. However, during the 17<sup>th</sup> and 18<sup>th</sup> centuries, turtles were imported to Bohemia and Silesia as lent-food for Catholics (ŠIROKÝ, 2000, 2001). This suggests that local Czech populations had already collapsed then. Moreover, in the 19<sup>th</sup> and 20<sup>th</sup> centuries, the developing intensive agriculture, heavy industry and the further growth of the human population deteriorated the majority of turtle habitats in the Czech Republic, surely leading to an extermination of most perhaps surviving relict populations.

Regarding the current state of *E. orbicularis* in the Czech Republic, there is little hope for any remaining native populations. From 1869–1929 repeated pond turtle findings were reported from northwestern Bohemia (FLASAR & FLASAROVÁ, 1975, 1995; MORAVEC, 1999; ŠIROKÝ, 2000). It is unclear whether these records refer to a native relict population or to introduced turtles. In this area no current findings are known. In Czech Silesia, a probably native population (Odra river basin, near Ostrava) disappeared at the beginning of 20<sup>th</sup> century. This population was probably connected with the continuous range of *E. orbicularis* in Poland (SMYČKA, 1899; ADOLPH, 1921). However, near Vidnava turtles survived until the second half of the 20<sup>th</sup> century (BENEŠ & HUDEČEK, 1992). The Vidnava reserve is located very close to the Polish border, and we located a suitable nesting site on the Polish side of the border. The shell of an adult turtle, found by the senior author in September 2000, encouraged further research. Despite intensive trapping and interviews of local anglers and inhabitants in 2001, we could not verify the survival of turtles there. In the centre of Moravia exist no suitable regions for *E. orbicularis*. Only in the floodplains of southern Moravia

relict populations could survive until now, as indicated by recent sightings. Further research is needed to survey this area.

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## References

- ADOLPH, R. 1921. *Emys orbicularis* L. in Mähren und dem früheren Oesterreich-Schlesien. Naturw. Beobachter **62**: 104–106.
- BEECH, M. 1995. The animal bones from the hallstatt settlement of Jenštejn, Central Bohemia, Czech Republic, pp. 99–140. In: DRESLEROVÁ, D. (ed.) A Late Hallstatt Settlement in Bohemia – Excavations at Jenštejn, 1984, Institute of Archaeology, Prague.
- BENEŠ, B. & HUDEČEK, J. 1992. Želva bahenní (*Emys orbicularis*) na severní Moravě a ve Slezsku. Čas. Slez. Muz. Opava (A) **41**: 179–183.
- FLASAR, I. & FLASAROVÁ, M. 1975. Die Wirbeltierfauna Nordwestböhmens (severozápadní Čechy). Die bisherigen Ergebnisse ihrer Erforschung. Zool. Abh. Mus. Tierkd. Dresden **33** (Suppl.): 1–150.
- FLASAR, I. & FLASAROVÁ, M. 1995. Die Ergänzungen zur Arbeit: Die Wirbeltierfauna Nordwestböhmens (severozápadní Čechy) – Die bisherigen Ergebnisse ihrer Erforschung. Doplňky k práci – Obratlovci severozápadních Čech – Dosavadní výsledky jejich výzkumu. Acta. Univ. Purkynianae. Studia Oecologica **2**. Ústí nad Labem. 11, 88 pp.
- FREISING, H. 1931. Jungsteinzeitliche Siedlungsreste bei Eisgrub. Tagesbote, Brno, **81** (193): 3.
- FRITZ, U. 1995. Kritische Übersicht der Fossilgeschichte der Sumpfschildkröten-Gattung *Emys* A. Duméril, 1806. Zool. Abh. Mus. Tierkd. Dresden **48**: 243–264.
- FRITZ, U. 1996. Zur innerartlichen Variabilität von *Emys orbicularis* (Linnaeus, 1758). 5b. Intraspezifische Hierarchie und Zoogeographie. Zool. Abh. Mus. Tierkd. Dresden **49**: 31–71.
- FRITZ, U. 1998. Introduction to zoogeography and sub-specific differentiation in *Emys orbicularis* (Linnaeus, 1758), pp. 1–27. In: FRITZ, U., JOGER, U., PODLOUCKÝ, R. & SERVÁN, J. (eds) Proceedings of the EMYS Symposium Dresden 96, Mertensiella **10**.

- FRITZ, U. 2003. Die Europäische Sumpfschildkröte. Laurenti, Bielefeld, 224 pp.
- KYSELÝ, R. 2002. The animal bones from a late Bronze Age feature at Ostrov. *Památky archeologické* **93**: 110–121.
- LOZEK, V. 1973. Příroda ve čtvrtohorách. Academia, Praha, 372 pp.
- LOZEK, V. 1981. Změny krajiny v souvislosti s osídlením ve světle Malakologických poznatků. *Archeologické Rozhledy* **33**: 176–188.
- MĚLYNARSKI, M. 1964. Nálezy želvy bahenní [*Emys orbicularis* (Linnaeus, 1758)] ze starého pleistocénu v jeskyni C 718 na Zlatém Koni u Koněprus. *Věstník Ústředního Ústavu Geologického* **39**: 449–453, Tab. 1.
- MORAVEC, J. 1999. To the introduction of the European pond turtle (*Emys orbicularis*) in the Central Bohemia. *Časopis Národního Muzea, Řada Přírodovědná* **168**: 117–119.
- MOTYKOVÁ, K. & ZÁPOTOCKÝ, M. 2002. Eneolitická sídliště (KNP, Badenská k.) v poloze "Na vrších" u Mlékojed, okr. Mělník. *Archeologie ve středních Čechách* **6**: 113–132.
- NEČAS, P., MODRÝ, D. & ZAVADIL, V. 1997. Czech Recent and Fossil Amphibians and Reptiles. An Atlas and Field Guide. Edition Chimaira, Frankfurt am Main, 94 pp.
- ONDŘÁČEK, J. 1962. Únětické pohřebiště u Rebešovic na Moravě. *Sborník Československé Společnosti Archeologické* **2**: 5–100.
- PESA, V. 1998. Dřevčice, okr. Česká Lípa, p. 46. In: *Výzkumy v Čechách 1996–7*, Archeologický ústav AV ČR, Praha.
- PESINA Z ČECHOŘODU, T. J. 1677. Mars Moravicus. [24] 958 [16] pp. + [2 suppl.].
- PEŠKA, J. & RAKOVSKÝ, I. 1987. Záchranný výzkum v Lanžhotě (okr. Břeclav), pp. 72–73. In: *Přehled výzkumů 1985*, Archeologický ústav AV ČR, Brno.
- PEŠKE, L. 1981. Osteologické nálezy ze Šakvic, poloha Štěpničky. *Archeologické rozhledy* **33**: 88–89.
- PEŠKE, L. 1985. Domáci a lovná zvířata podle nálezů na slovanských lokalitách v Čechách. *Acta Mus. Nat. Pragae, Series A – Historia* **39**: 209–216.
- PETRBOK, J. 1933. Želva: *Emys orbicularis* L. v České prehistorii? *Věda přírodní* **14**: 248–249.
- PROŠEK, F. & LOZEK, V. 1952. Mesolitické sídliště v Zátyni u Dubé. *Anthropozoikum* **2**: 93–160.
- RAKOVSKÝ, I. 1978. Sídlíště kultury s moravskou malovanou keramikou v Jezeřanech-Maršovicích (okr. Znojmo), pp. 20–21. In: *Přehled výzkumů 1976*, Archeologický ústav AV ČR, Brno.
- ŠIROKÝ, P. 2000. A review of the distribution of the European pond turtle, *Emys orbicularis* (Linnaeus, 1758), in the Czech Republic until 1999. *Faunist. Abh. Mus. Tierkd. Dresden* **22**: 69–83.
- ŠIROKÝ, P. 2001. Želva bahenní – *Emys orbicularis* (Linnaeus, 1758), pp. 23–30, 179–184. In: MIKÁTOVÁ, B., VLAŠÍN, M., ZAVADIL, V. (eds) *Atlas rozšíření plazů v České republice. Atlas of the Distribution of Reptiles in the Czech Republic*, Agentura ochrany přírody a krajiny České republiky, Brno and Praha.
- SKUTIL, J. 1935. Předhistorické nálezy želvích zbytků z ČSR. *Věda přírodní* **16**: 235–237.
- SKUTIL, J. 1949. Nové nálezy časně historického želvího zbytku z Lednice. *Vlastivědný Věstník Moravský* **4**: 117.
- SKUTIL, J. 1960. Nález želvích zbytků ze slovanské mohyly v Čejči na Hodonínsku. *Sborník ČSAV, Archeologický ústav, Brno* **1**: 83–88, Tab. 27–28.
- SMRŽ, Z. 1975. Dobroměřice, okr. Louny, pp. 31–32. In: *Výzkumy v Čechách 1972*, Archeologický ústav AV ČR, Praha.
- SMYČKA, F. 1899. Erster Bericht über das Vorkommen der europäischen Sumpfschildkröte (*Emys lutaria* Mars.) im Flussgebiete der Oder in Mähren und Österreichisch-Schlesien. *Věstník Král. Čes. Spol. Nauk, Tř. Mat.-Přírodověd., Praha* **15**: 1–5.
- ŠTEPÁNEK, O. 1949. Obojživelníci a plazi zemí českých se zřetelem k fauně střední Evropy. *Arch. přír. výzkum Čech, Praha, nová řada*, 122 pp.
- STUHLÍK, S. 1977. Sídlíště z doby bronzové v Bulharech (okr. Břeclav), pp. 20–21. In: *Přehled výzkumů 1975*, Archeologický ústav AV ČR, Brno.
- STUHLÍK, S. 1991. Třináctá sezóna na výzkumu v Borotcích (okr. Znojmo), pp. 28–30. In: *Přehled výzkumů 1988*, Archeologický ústav AV ČR, Brno.
- SVOBODA, J. 1998. Dřevčice, okr. Česká Lípa, p. 47. In: *Výzkumy v Čechách 1996–7*, Archeologický ústav AV ČR, Praha.
- ULLRICH, H. & MĚLYNARSKI, M. 1978. Reptilienreste aus dem jungpleistozänen Travertin von Burgtonna in Thüringen. *Quartärpaläontologie* **3**: 97–102.
- ZALESKÝ, M. 1922. O chovu želez na rybnících Třeboňská a Hlubocka v XVII. až XVIII. století. *Československý Rybář, Praha* **2**: 36–38, 48–49.
- ZALESKÝ, M. 1925. Želvy pana Petra Voka z Rožmberku na Třeboni. *Akvaristické Listy, Praha* **4**: 61.
- ZÁZVORKA, V. 1938. *Trogontherium cuvieri* Fischer from Přezletice (Central Bohemia) and a comparison with the other known localities of *Trogontherium* in Europe. *Acta Mus. Nat. Pragae* **1B**: 125–138, Tab. 6.
- ZÁZVORKA, V. 1957. Nález pozůstatků želvy v pleistocénu na Zlatém koni u Koněprus. *Časopis pro Mineralogii a Geologii* **11**: 83.