

## Heteromorph ammonite *Parapatoceras* from the Lower Callovian of Villány, South Hungary

GALÁ CZ, András<sup>1</sup>, FÖLDVÁRI, Gabriella<sup>2</sup>

<sup>1</sup>Department of Palaeontology, ELTE Eötvös Loránd University, Institute of Geography and Earth Sciences,  
H-1117 Budapest, Pázmány Péter sétány 1/c, Hungary  
E-mail: andras.galacz@gmail.com  
<sup>2</sup>H-8254 Kővágóörs, Kossuth utca 44.  
E-mail: ammonites53@gmail.com

### *A heteromorph Parapatoceras ammonitesz genus előfordulása a villányi alsó calloviban*

#### Összefoglalás

A gazdag középső jura (callovi) faunájáról ismert villányi ammoniteszes padból nemrég előkerült egy *Parapatoceras* példány. Ez a heteromorf (kicsavarodott) ammonitesz nem ritka, különösen az európai callovi faunákban, de Villányból, az ezrével gyűjtött és két klasszikus monográfiában feldolgozott anyagban egyetlen példányként ritkaságnak számít. A dolgozat a példány leírását adja, és egyúttal áttekintést nyújt a Magyarországról, a középső jurából eddig ismert heteromorf ammoniteszekről.

*Tárgyszavak:* Parapatoceras, heteromorf ammoniteszek, középső jura, callovi, Villány

#### Abstract

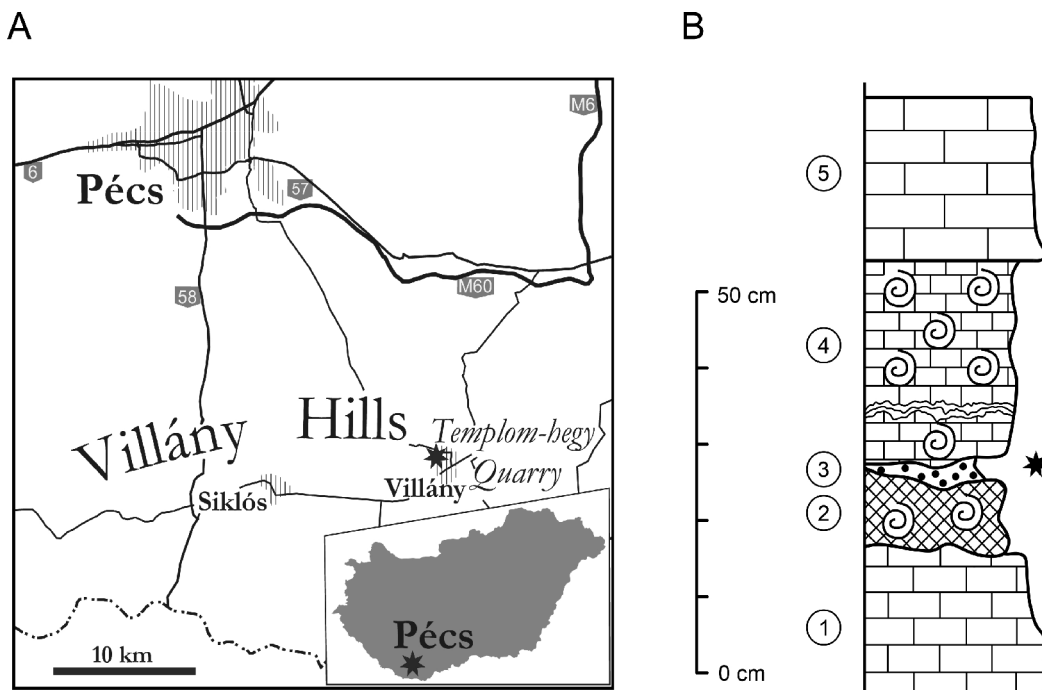
In the rich Middle Jurassic ammonite fauna of the famous ammonitic bank of Villány, South Hungary, recently a *Parapatoceras* specimen was found. This ammonite, a Callovian heteromorph, usually occurs in Callovian assemblages in Europe and elsewhere, however, the appearance in the Villány fauna, known on the basis of thousands of specimens and worked out in two classic monographs, seems to be a true rarity. The specimen is formally described, and previous records of Middle Jurassic heteromorph ammonites from Hungary are briefly summarized.

*Keywords:* Parapatoceras, heteromorph ammonites, Middle Jurassic, Callovian, Villány

### Introduction

The ammonites of the famous 'Dogger bed' of Villány in the Villány Hills, South Hungary have been subject of several studies in the last 100–110 years (*Fig. 1*). All these studies were based on extensive collections, mainly from the quarry on the Templom-hegy (Templom Hill). A. TILL, the first who wrote a monograph on the ammonite fauna had 331 specimens (TILL 1911, p. 48), L. LÓCZY jun., who published the next monograph, had nearly 1,000 specimens (LÓCZY 1915, p. 1), and subsequent collections in the 1960's and 1970's and later resulted in several hundred new examples. Despite of the detailed evaluations of the fauna by the earlier and later authors, heteromorph ammonites were found only

in the Bathonian, but never in the far richer Callovian material. Some years ago Károly TAMÁS and Gabriella FÖLDVÁRI collected ammonites at the Templom Hill locality, and their material was repositied in the Tamás–Földvári Fossil Collection at Kővágóörs. While looking through this valuable ammonite collection, one *Parapatoceras* specimen was recognized. This heteromorph ammonite is not a rarity, it occurs in wide distribution in Early Callovian faunas in Europe and beyond. However, its appearance as a singleton within a material studied extensively on the basis of nearly two thousand known specimens is worth discussing in detail. The occurrence of this apparently exceptional form gives a good occasion to offer a short overview on these unusual ammonites in the Middle Jurassic of Hungary.



**Figure 1.** Location of the described specimen. A: Villány, Templom-hegy locality (asterisk) in South Hungary. B: The Jurassic rocks in the Templom-hegy quarry, with the bed (asterisk) yielding the here described *Parapatoceras*. 1: Pliensbachian, 2: Upper Bathonian, 3: Lower Callovian, 4: Middle-Upper Callovian, 5: Middle Oxfordian (after VÖRÖS 2012, fig. 2/c, modified)

**I. ábra.** A leírt példány származása. A: Villány, a templom-hegyi lelőhely (csillaggal jelölve) Dél-Magyarországon. B: Jura rétegek a villányi Templom-hegy kőfejtőjében, csillaggal jelölve a leírt *Parapatoceras*-t szolgáltató réteg. 1: pliensbachai, 2: felső bath, 3: alsó callovi, 4: középső-felső callovi, 5: felső oxfordi (VÖRÖS A. 2012, 2/c ábrája után)

### Middle Jurassic heteromorph ammonites in Hungary

These unusual, uncoiled ammonites have three, probably independent appearances in the Jurassic: one in the Late Bajocian (*Spiroceras* QUENSTEDT, 1856), the next in the Late Bathonian (*Parapatoceras* SPATH, 1924, *Paracuariceras* SCHINDEWOLF, 1963 and *Acuariceras* SPATH, 1933), and the third in the Tithonian (*Bochianites* LORY, 1898 and allies). The Bajocian and Bathonian forms are respectively included into Subfamily Spiroceratinae HYATT, 1900 and Subfamily Parapatoceratinae BUCKMAN, 1926 of Family Spiroceratidae HYATT, 1900 within Superfamily Spiroceratoidea HYATT, 1900 (see HOWARTH 2017, pp. 85–89), and *Bochianites* belongs to Family Bochianitidae SPATH, 1922 of Suborder Ancyloceratina, WIEDMANN, 1966.

Middle Jurassic heteromorph ammonites were first found in Hungary by M. HANTKEN in the 1860's in the Bakony Mts (see GALÁCZ 2022), but he interpreted them as Tithonian *Hamites*. Middle Jurassic heteromorph ammonites (as *Apsorroceras* and *Spiroceras*) were collected in the Bakony Mts and listed in a paper by J. NOSZKY jun. (1943). Upper Bajocian heteromorphs in rich representation were described from Gyenespuszta, another Bakony locality (GALÁCZ 1980). Three *Spiroceras* species were described from the Upper Bajocian and a fragmentary specimen from the basal Bathonian *Zigzagiceras* Zigzag Zone as *?Parapatoceras* sp.

In the Vértes Hills, in the Upper Bathonian fissure-filling limestone on Csóka-hegy, the ammonite assemblage contained a tiny *Parapatoceras distans* (BAUGIER & SAUZÉ) specimen (GALÁCZ 1995, pl. 19, fig. 26).

The first Middle Jurassic heteromorph ammonites from the Mecsek Mts, South Hungary were described and figured by J. BÖCKH (1881, p. 65, pl. 3, figs 1–2) as '*Ancyloceras baculatum* QUENSTEDT'. One of these specimens was refigured, and a newly-found example was also presented by I. Z. NAGY (1963). During the revision of the Bathonian red nodular limestone of the Mecsek Mountains, the Upper Bathonian beds in the Óbánya valley yielded two *Parapatoceras* specimens belonging to *P. distans* (BAUGIER & SAUZÉ) and *P. tenue* (BAUGIER & SAUZÉ) (GALÁCZ 1995, pl. 3, figs 6, 7).

The only, hitherto known Villány heteromorph ammonite, an incomplete *Parapatoceras tenue* specimen came from the Bathonian Altáró Bed below the Callovian ammonitic bank. It was published in the paper treating the Bathonian ammonite fauna from Villány (GÉCZY & GALÁCZ 1998, p. 496, pl. 2, fig. 9).

Accordingly, Middle Jurassic heteromorph ammonites are documented in faunas of both main Mesozoic paleogeographic units in Hungary: from the Transdanubian Mid-mountains representing the pelagic regime of the Mediterranean Tethys and from the Mecsek and Villány Mountains lying near the southern margin of the European craton in the Jurassic.

## Provenance of the studied specimen

On the basis of the matrix of the specimen, the exact provenience can be well determined as the Lower Callovian Alagút Bed of the Villány Formation represented with a 6–8 centimetres thick layer in the Templom Hill quarry (VÖRÖS 2012). This is unequivocally indicated by the iron ooids with 1–2 mm rounded quartz grains in the soft, greyish-brown limestone matrix. This is a feature distinguishes this particular bed from the underlying Upper Bathonian limestone of the Altáró Bed and the overlying late Lower to Middle Callovian stromatolitic limestone bed (Templomhegy Member). The distinguished faunal assemblage of the Lower Callovian bed was listed by GÉCZY (1984) and was referred by VÖRÖS (2010, 2012) as of *Macrocephalites gracilis* Zone.

## Systematic palaeontology

In the description of the specimen, the systemic arrangement of the Treatise Online (HOWARTH 2017) is followed. In the synonymy list the references that appeared after the monograph of DIETL (1978) are listed.

Superfamily Spiroceratoidea, HYATT, 1900  
 Family Spiroceratidae HYATT 1900  
 Subfamily Parapatoceratinae BUCKMAN, 1926  
 Genus *Parapatoceras* SPATH, 1924

*Parapatoceras tuberculatum* (BAUGIER & SAUZÉ, 1843)  
 Fig. 2a–b.

1843. *Toxoceras* ? *tuberculatus* – BAUGIER & SAUZÉ, p. 11, pl. 4, figs 1–2.  
 1978. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ) – DIETL, p. 44, text-fig. 7g; 13c.d; pl. 7, figs 11.12; pl. 8, figs 1–5. (*cum syn.*)  
 1978. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ) – MEHL, p. 96, text-fig. 1.  
 1979. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ) – MUNK, p. 223, figs 6A, B, D.  
 1994. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ, 1843) – PANDEY et al., p. 66, figs 2–7.  
 1994. *Parapatoceras tuberculatum* (BAUGIER et SAUZÉ, 1843) – DIETL, p. 192, pl. 90, fig. 3a–c.)  
 1996. *Parapatoceras tuberculatum* (BAUGIER et SAUZÉ) – PATRULIUS, p. 14, pl.1, figs 1, 17; pl. 2, figs 1–2.  
 1997. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ, 1843) – JAIN & PANDEY, p. 134, text-fig. 4, pl. 1, figs 1–3; 5–6; 8–9 (only)  
 ?2001. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ) – FERNÁNDEZ-LÓPEZ, p. 38, pl. 2, fig. 11.  
 2002. *Parapatoceras tuberculatum* (BAUGIER et SAUZÉ, 1843) – GULYAEV, p. 607, text-fig. 2.  
 ?2016. *Parapatoceras* cf. *tuberculatum* (BAUGIER and SAUZÉ, 1843) – BERT & COURVILLE, p. 120, fig. 3.  
 2018. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ, 1843) – JAIN, p. 259, figs 4, 5.  
 non 2024. *Parapatoceras* cf. *tuberculatum* (BAUGIER & SAUZÉ, 1843) – MAHBOUBI et al., p. 297, figs 3A–C.

Description. The incomplete specimen is a 50 mm long, slightly arched portion, with oval whorl section of 8 mm

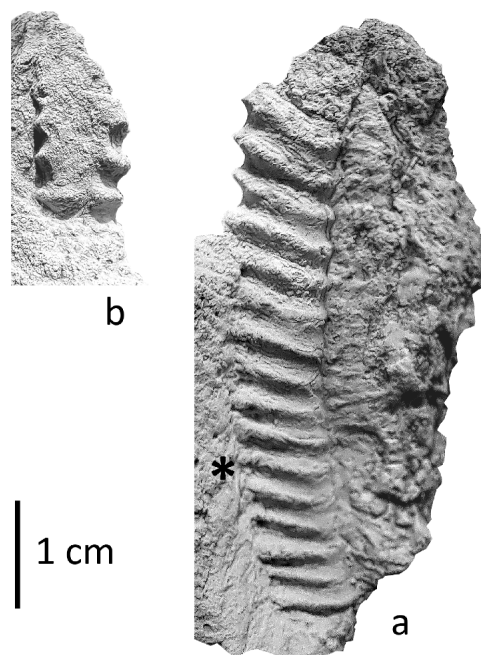


Figure 2. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ, 1843) from the Lower Callovian *Macrocephalites gracilis* Zone of Villány, Templom-hegy Quarry. a: lateral view, b: ventral view of the preserved distal part, asterisk indicates end of phragmocone.

2. ábra. *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ, 1843) a villányi Templom-hegy alsó callovi *Macrocephalites gracilis* Zónájából. a: laterális nézet, b: a példány egy részének ventrális nézete, a csillag a kamrázott rész végét jelzi.

height and 7 mm width at the preserved distal end. These latter values are attained by slight grow along the length of the specimen. The recrystallized shell is preserved, thus only some elements of the simplified suture-line are visible. The specimen is septate up to one third of the preserved length.

The sculpture consists of narrowly rounded ribs arising on the dorsal side. They are straight and prorsiradiate on the lateral side, bearing a pointed tubercle on the venter, then terminating abruptly. A narrow smooth ventral groove is formed this way.

Comparison and remarks. The specimen, with its comparatively dense, projected ribs and the narrow smooth groove on the venter shows good agreement with the original figures of the (probably lost) type and with the illustrations of subsequent records of the species. With its sculpture *P. tuberculatum* is well distinguished from *P. distans*, the other commonly recorded species of the Bathonian–Callovian genus. This latter has ribs without tubercles, wider intercostal portions and circular cross-section.

Stratigraphically *P. tuberculatum* ranges through the lower and middle Callovian (i. e. from the *Macrocephalum* to the *Aceps* zones). Recently BERT & COURVILLE (2016) recorded and figured a *P. cf. tuberculatum* specimen from the upper Callovian *Athleta* Zone of Burgundy (Eastern France). However, the specimen is so poorly preserved (a 1 cm fragment showing a few ribs only) that the occurrence of the species has yet to be confirmed by newer, better finds.

As of paleogeography, the Bathonian–Callovian *Para-*

*patoceras* shows global distribution (see DIETL 1973; 1978). Occurrences are recorded from several parts of Europe, from the eastern Gondwana margin (India and Madagascar), and in wide zone of the Eastern Pacific (from Mexico down to Chile and Argentina). All these appearances are in epicontinental seas or oceanic shelf regions. Those of the Vértes Hills of Hungary (GALÁ CZ 1995) and of western Sicily of Italy (WENDT 2017, pl. 3) are records from submarine highs within the open oceanic realm of the Western Tethys. Significant is the recent record from Russia. GULYAEV (2002) described specimens of *P. tuberculatum* from the Russian platform, more than 500 km northeast from Moscow, well inside the Subboreal realm, in a characteristic ammonite assemblage (with *Torricelliceras*, *Cadoceras* etc.). The doubtful fossil described recently as ‘*Parapatoceras* cf. *tuberculatum*’ (in MAHBOUBI et al. 2024, fig. 3A-C) from Algeria needs further studies.

The global distribution of *Parapatoceras* species is similar to the world-wide appearances of some late Bajocian *Spi-*

*roceras*. This is probably a reflection of their planktonic-nektoplanktonic life (HOFFMANN et al. 2021).

## Conclusions

The recognition of a single specimen of *Parapatoceras tuberculatum* in the Callovian fauna of Villány is a small but significant contribution to drawing a picture on the faunal spectrum of this famous locality. This record is an addition to the distribution area of this Callovian form. On the other hand, this find shows that even the richest and best studied fossil assemblages may hold valuable novelties in reserve.

## Acknowledgements

The authors thank István SZENTE and Zsófia ROMÁN for helping in *Figure 1*, and István FÖZY for editorial suggestions.

## References

- BERT, D. & COURVILLE, P. 2016: First record of Late Callovian and Early Oxfordian heteromorph ammonites. – *Annales de Paléontologie*, **102**, 117–121.
- BÖCKH J. 1881: Adatok a Mecsekhegység és dombvidéke jurakorbeli lerakódásainak ismeretéhez. II. Palaeontologiai rész. – *Értekezések a Természettudományok Köréből*, **11/9**, 1–106.
- DIETL, G. 1973: Middle Jurassic (Dogger) heteromorph ammonites. – In: HALLAM, A. (Ed.): *Atlas of Palaeobiogeography*. Elsevier, Amsterdam, 283–285.
- DIETL, G. 1978: Die heteromorphen Ammoniten des Dogger. – *Stuttgarter Beiträge zur Naturkunde*, Serie B, **33**, 1–97.
- DIETL, G. 1994: *Parapatoceras tuberculatum* – In: FISCHER, J.-C. (Ed.): *Révision critique de la Paléontologie Française d’Alcide d’Orbigny. Vol. I. Céphalopodes jurassiques*. Masson, Paris, 340 p.
- FERNÁNDEZ-LÓPEZ, S. R. 2001: Upper Bathonian ammonites of the Catalan Basin (Tivissa and Cap Salou, Spain). – *Hantkeniana*, **3**, 25–39.
- GALÁ CZ, A. 1980: Bajocian and Bathonian ammonites from Gyenespuszta, Bakony Mts., Hungary. – *Geologica Hungarica, Series Palaeontologica*, **39**, 1–227.
- GALÁ CZ, A. 1995: Revision of the Middle Jurassic ammonite fauna from Csóka-hegy, Vértes Hills (Transdanubian Hungary). – *Hantkeniana*, **1**, 119–129.
- GALÁ CZ, A. 2022: HANTKEN Miksa és a magyarországi ammoniteszkutatások kezdetei. – *Földtani Közlöny*, **152/2**, 139–146. DOI: 10.23928/foldt.kozl.2022.152.2.,139.
- GÉCZY, B. 1984: The Jurassic ammonites of Villány. – *Annales Universitatis Scientiarum Budapestinensis, Sectio Geologica*, **24**, 189–198.
- GÉCZY, B. & GALÁ CZ, A. 1998: Bathonian ammonites from the classic Middle Jurassic locality of Villány, South Hungary. – *Revue de Paléobiologie, Genève*, **17/2**, 479–511.
- GULYAEV, D. B. 2002: The first find of heteromorph ammonites in the Lower Callovian of European Russia. – *Paleontological Journal*, **36/6**, 606–608.
- HOFFMANN, R., SLATTERY, J. S., KRUTA, I., LINZMEIER, B. J., LEMANIS, R. E., MIRONENKO, A., GOOLAERTS, S., DE BAETS, K., PETERMAN, D. J. & KLUG, C. 2021: Recent advances in heteromorph ammonoid paleobiology. – *Biological Reviews*, **96**, 576–610. DOI: 10.1111/brv.12669
- HOWARTH, M. K. 2017: Part L, Revised, Volume 3B, Chapter 6: Systematic description of the Stephanoceratidea and Spiroceroidea. – *Treatise Online* 84, University of Kansas, 1–101.
- JAIN, S. 2018: Genus *Parapatoceras* SPATH from Kachchh and the likely ancestor of *Epistrenoceras* BENTZ (Ammonoidea, Middle Jurassic). – *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen*, **288/3**, 255–272. DOI: 10.1127/njpa/2018/0740
- JAIN, S. & PANDEY, D., K. 1997: Revision of the age of heteromorph ammonite *Parapatoceras* from Kachchh, Western India. – *Journal of Palaeontological Society of India*, **42**, 133–139.
- LÓCZY, L. 1915: Monographie der Villányer Callovien-Ammoniten. – *Geologica Hungarica*, **1/3–4**, 1–248.
- LORY, P. 1898: Le Crétacé inférieur de Dévolvy et des régions voisines. – *Bulletin de la Société Géologique de France*, **3/26**, 132–138.

- MAHBOUBI, C. Y., JAIN, S. & NAIMI, M. N. 2024: First record of the heteromorph ammonite genus *Parapatoceras* SPATH, 1924 from the lower Callovian (Middle Jurassic) of Algeria. – *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* **310/3**, 293–300. DOI: 10.1127/njpa/2024/1184
- MEHL, J. M. 1978: *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ 1843), ein heteromorpher Ammonit aus dem Callovium von Kandern/Südbaden. – *Berichte der Naturforschenden Gesellschaft zu Freiburg im Breisgau*, **68**, 95–101.
- MUNK, CH. 1979: Heteromorphe Ammoniten aus dem Unter-Callovien („Macrocephalen-Schichten“) von Westrand der Nördlichen Frankenalb (S-Deutschland). – *Paläontologische Zeitschrift*, **53**, 220–229.
- NAGY, I. Z. 1963: Ammonites déroulés (Spiroceratidae) dans le couches jurassiques de la Montagne Mecsek. – *A Magyar Állami Földtani Intézet Évi Jelentése 1960 évről*, 197–201.
- NOSZKY J. jun. 1943: Földtani vázlat az Északi-Bakony belső részéből. (Előzetes jelentés az 1940. évi földtani felvételekről). – *A Magyar Királyi Földtani Intézet Évi Jelentése (1939–40)/1*, 248–252.
- PANDEY, D. K., CALLOMON, J. H. & FÜRSICH, F. T. 1994: On the occurrence of the Callovian ammonite *Parapatoceras tuberculatum* (BAUGIER & SAUZÉ 1843) in Kachchh, Western India. – *Paläontologische Zeitschrift*, **68**, 63–69.
- PATRULIUS, D. 1996: Ammonites hétéromorphes et autres Parkinsoniidés du Bathonien-Callovien inférieur de Vadu Crisului (Monts Apuseni – Roumanie). – *Memoriile Institutului Geologie al României*, **36**, 13–19.
- TILL, A. 1911: Die Ammonitenfauna des Kelloway von Villány (Ungarn). – *Beiträge zur Paläontologie und Geologie Österreich-Ungarns und des Orients*, **24**, 1–49.
- VÖRÖS A. 2010: A villányi mezozoos rétegsor: visszatekintés új nézőpontból. – *Földtani Közlöny*, **140/1**, 3–30.
- VÖRÖS, A. 2012: Episodic sedimentation on a peri-Tethyan ridge through the Middle–Late Jurassic transition (Villány Mountains, south Hungary). – *Facies*, **58**, 415–443. DOI 10.1007/s10347-011-0267-8
- WENDT, J. 2017: A unique fossil record from neptunian sills: the world’s most extreme example of stratigraphic condensation (Jurassic, western Sicily). – *Acta Geologica Polonica*, **67/2**, 163–199. DOI: 10.1515/agp-2017-0015

Manuscript received: 27/03/2024