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New location of the known Silurian graptolite *Monograptus uncinatus* Tullberg, 1883 in the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland

Tomasz Borowski

The Institute of Biopaleogeography named under Charles R. Darwin, Złocieniec, Poland

E-mail address: tomasz.elvis.borowski@wp.pl

ABSTRACT

This paper presents the new location of the known graptolite genus – *Monograptus* Geinitz, 1852, in the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland. This specimen of the genus *Monograptus* was obtained as a result of many years of exploration in this mine, by searching individual lots of post-glacial materials extracted by this mine.

Keywords: *Monograptus*, Mielenko Drawskie, Graptolites, the Silurian period, post-glacial materials, Mineral Raw Materials Mine in Mielenko Drawskie, *Monograptus uncinatus*

1. INTRODUCTION

Almost all stratigraphic equivalents of graptolite levels occurring in both the classic British and Czech Silurian have been found in the Polish Silurian so far. However, with the general correlation of the Polish Silurian sediments with the European Silurian, there are quite clear stratigraphic incompatibilities.

This is caused by a lack of continuous profiles (layers) due to frequent tectonic processes. Due to all these elements, such good stratigraphic indicators as graptolites in the Polish Silurian formations did not give satisfactory results in terms of the correlation of these sediments in Europe.

Occurrence: Graptolites – an extinct group of animals included in the hemichordates, lived from the Cambrian to the Early Carboniferous period, while true graptolites were present from the Ordovician to the Early Devonian period. Graptolites of the genus *Monograptus* lived in the Silurian period and in the earliest Devonian period.

Characteristics: A single-branch rhabdosome, thecae are only on one side (uniseriate). It can be straight or spiral coiled.

The fossils of the various *Monograptus* species are among the basic index fossils in the Silurian and the Lower Early Devonian, especially in Europe and North America.

Monograptus – a genus of cosmopolitan distribution, known from all continents except Antarctica, although in Africa only from its northern part, and from South America and Australia known only from single locations.

Graptolites of the genus *Monograptus* are very rare in northern Poland. However, these Silurian hemichordates can be sometimes found in open-pit aggregate mines. This is due to the deposition of post-glacial deposits from the last glacial period on the Scandinavian peninsula.

Description – *Monograptus uncinatus* Tullberg, 1883: Simple rhabdosome. Straight sicula 1.5 to 2.5 mm long. Straight, cylindrical, short and tall thecae, at the base deviating from the rhabdosome axis by 45°. Hooked, pridon-type apertural lobe, without lateral spines. Lateral edge slightly protruding.

Maps 1-4 show the location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland.

Photos 1-4 show the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland (photos taken by Tomasz Borowski).

Photos 5-10 show the Silurian hemichordates of the genus *Monograptus* from the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland (photos taken by Tomasz Borowski).

Paleontological systematics (Taxonomy)

Kingdom: Animalia

Phylum: Hemichordata

Class: Graptolithina

Order: Graptoloidea Lapworth, 1873

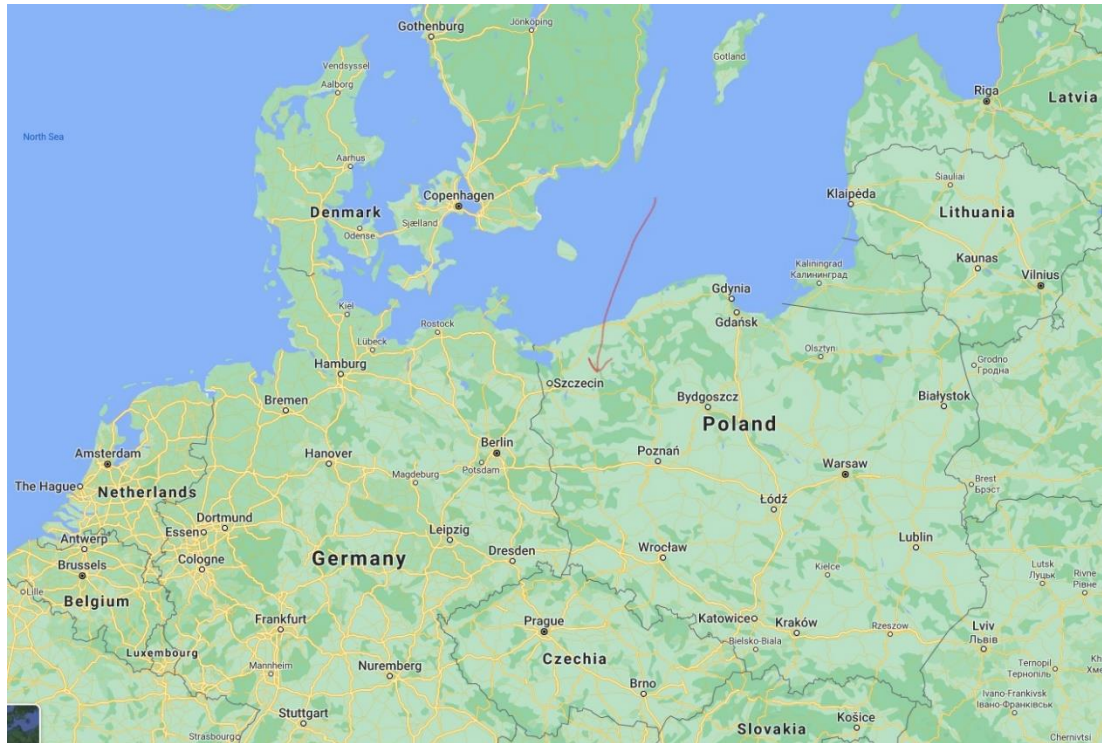
Family: Monograptidae Lapworth, 1873

Genus: *Monograptus* Geinitz, 1852

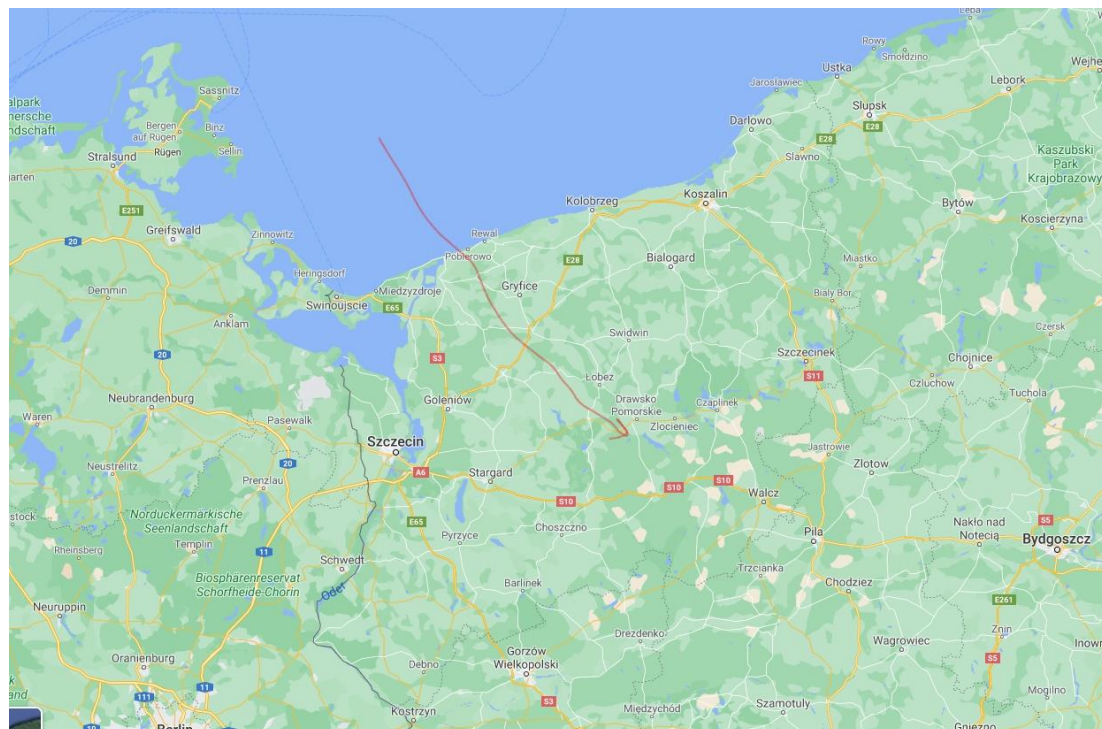
Spec.: *Monograptus uncinatus* Tullberg, 1883

2. SEARCH RESULT

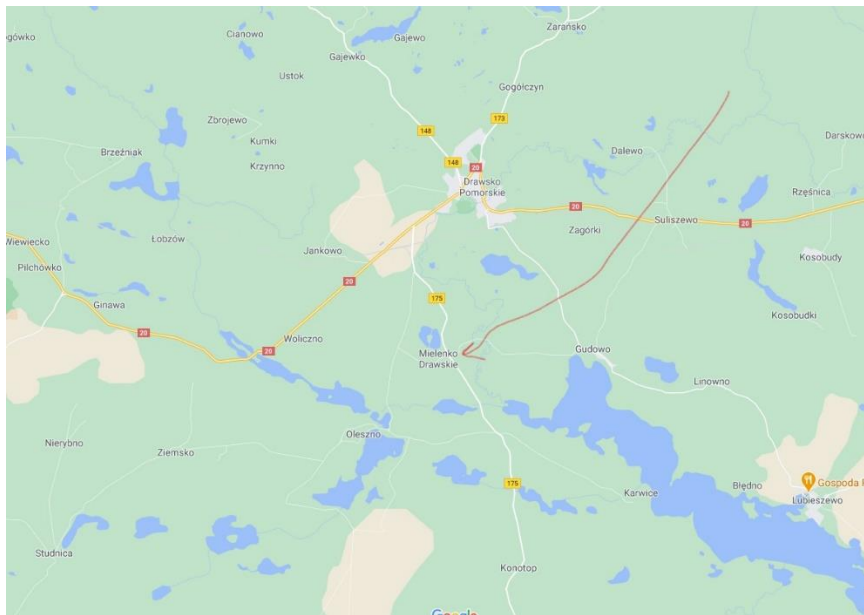
The maps & photos show the location of The Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland (53.499249 N, 15.777899 E) (**Maps 1-4** & **Photos 1-4**). The **Photos 5-10** show the discovered Silurian graptolite *Monograptus uncinatus* Tullberg, 1883.



Map 1. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland.



Map 2. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland



Map 3. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland



Map 4. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland



Photo 1. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland



Photo 2. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland



Photo 3. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland



Photo 4. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland



Photo 5. Hemichordates of the genus *Monograptus* Geinitz, 1852.
(*Monograptus uncinatus* Tullberg, 1883)



Photo 6. Hemichordates of the genus *Monograptus* Geinitz, 1852.
(*Monograptus uncinatus* Tullberg, 1883)



Photo 7. Hemichordates of the genus *Monograptus* Geinitz, 1852.
(*Monograptus uncinatus* Tullberg, 1883)



Photo 8. Hemichordates of the genus *Monograptus* Geinitz, 1852.
(*Monograptus uncinatus* Tullberg, 1883)



Photo 9. Hemichordates of the genus *Monograptus* Geinitz, 1852.
(*Monograptus uncinatus* Tullberg, 1883)



Photo 10. Hemichordates of the genus *Monograptus* Geinitz, 1852.
(*Monograptus uncinatus* Tullberg, 1883)

3. CONCLUSION

The new discovery site of the Silurian graptolite *Monograptus uncinatus* Tullberg, 1883 in the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland is documented and entered into the world map of the species distribution.

Acknowledgments

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References

- [1] Hughes, R. (1995). The durations of Silurian graptolite zones. *Geological Magazine*, 132(1), 113-115. doi:10.1017/S0016756800011468
- [2] Zalasiewicz, Jan 2001. Graptolites as constraints on models of sedimentation across Iapetus: a review. *Proceedings of the Geologists' Association*, Vol. 112, Issue. 3, p. 237.
- [3] Stone, P. Breward, N. Merriman, R. J. and Barnes, R. P. 2006. The interpretation and application of regional geochemistry: lessons from the Paratectonic Caledonides. *Scottish Journal of Geology*, Vol. 42, Issue. 1, p. 65
- [4] Zalasiewicz, J., Taylor, L., Rushton, A., Loydell, D., Rickards, R., & Williams, M. (2009). Graptolites in British stratigraphy. *Geological Magazine*, 146(6), 785-850. doi:10.1017/S0016756809990434
- [5] Beamish, D. Kimbell, G.S. Stone, P. and Anderson, T.B. 2010. Regional conductivity data used to reassess Early Palaeozoic structure in the Northern Ireland sector of the Southern Uplands–Down–Longford terrane. *Journal of the Geological Society*, Vol. 167, Issue. 4, p. 649
- [6] Breward, N. Stone, P. Flight, D. and Anderson, T. B. 2011. Regional geochemical comparisons from the Lower Palaeozoic, Southern Uplands–Down–Longford terrane in Northern Ireland and Scotland. *Scottish Journal of Geology*, Vol. 47, Issue. 1, p. 33
- [7] Foote, Michael Sadler, Peter M. Cooper, Roger A. and Crampton, James S. 2019. Completeness of the known graptoloid palaeontological record. *Journal of the Geological Society*, Vol. 176, Issue. 6, p. 1038
- [8] R. B. Rickards. The sequence of Silurian graptolite zones in the British Isles. *Geological Journal* Volume 11, Issue 2, 1976, Pages 153-188. <https://doi.org/10.1002/gj.3350110205>
- [9] Bjerreskov, M. 1975. Llandoveryan and Wenlockian graptolites from Bornholm. *Fossils and Strata* 8, 1–94
- [10] Howe, M. P. A. 1983. Measurement of thecal spacing in graptolites. *Geological Magazine* 120, 635–638

- [11] Loydell, D. K. 1998. Early Silurian sea-level changes. *Geological Magazine* 135, 447–471
- [12] Loydell, D. K. & Cave, R. 1993. The Telychian (Upper Llandovery) stratigraphy of Buttington Brick Pit, Wales. *Newsletters on Stratigraphy* 29, 91–103
- [13] Loydell, D. K., Kaljo, D. & Mannik, P. 1998. Integrated biostratigraphy of the lower Silurian of the Ohesaare core, Saaremaa, Estonia. *Geological Magazine* 135, 769–83
- [14] Loydell, D. K., Mannik, P. & Nestor, V. 2003. Integrated biostratigraphy of the lower Silurian of the Aizpute-41 core, Latvia. *Geological Magazine* 140, 205–29
- [15] Schauer, M. 1971. Biostratigraphie und Taxonomie der Graptolithen des tieferen Silurs unter besonderer Berücksichtigung der tektonischen Deformation. *Freiberger Forschungshefte (C) Paläontologie* 273, 1–185
- [16] Štorch, P. 1994. Llandovery–Wenlock boundary beds in the graptolite-rich sequence of the Barrandian area (Bohemia). *Journal of the Czech Geological Society* 39, 163–182
- [17] Štorch, P. 1998. New data on Telychian (Upper Llandovery, Silurian) graptolites from Spain. *Journal of the Czech Geological Society* 43(3), 113–142
- [18] Loydell, D., Sarmiento, G., Štorch, P., & Gutiérrez-Marco, J. (2009). Graptolite and conodont biostratigraphy of the upper Telychian–lower Sheinwoodian (Llandovery–Wenlock) strata, Jabalón River section, Corral de Calatrava, central Spain. *Geological Magazine*, 146(2), 187–198. doi:10.1017/S0016756808005840
- [19] Štorch, P. and Štěpán Manda. Little known Homeric (lower Silurian) graptolites from kosov quarry near Beroun, the Czech Republic. *Fossil Imprint* 75 (2019) 44–58
- [20] Tomasz Borowski. Chasmops – a typical representative of the family Pterygometopidae (Reed, 1905) found in an aggregate mine in Mielenko Drawskie, West Pomerania Province, Poland. *World Scientific News* 57 (2016) 81–90
- [21] Rafał Morga, Mirosława Pawlyta, Microstructure of graptolite periderm in Silurian gas shales of Northern Poland. *International Journal of Coal Geology*, Volume 189, 2018, Pages 1–7, <https://doi.org/10.1016/j.coal.2018.02.012>
- [22] Rafał Morga, Małgorzata Kamińska, The chemical composition of graptolite periderm in the gas shales from the Baltic Basin of Poland. *International Journal of Coal Geology* Volume 199, 2018, Pages 10–18. <https://doi.org/10.1016/j.coal.2018.09.016>
- [23] Qingyong Luo, Goodarzi Fariborz, Ningning Zhong, Ye Wang, Nansheng Qiu, Christian B. Skovsted, Václav Suchý, Niels Hemmingsen Schovsbo, Rafał Morga, Yaohui Xu, Jingyue Hao, Anji Liu, Jin Wu, Weixun Cao, Xu Min, Jia Wu. Graptolites as fossil geo-thermometers and source material of hydrocarbons: An overview of four decades of progress. *Earth-Science Reviews*, Volume 200, 2020, 103000. <https://doi.org/10.1016/j.earscirev.2019.103000>
- [24] Anna Kozłowska and Denis E.B. Bates. *Kirkigraptus*, a new retiolitid graptolite from Poland. *Acta Palaeontologica Polonica* 53 (1), 2008: 105–112. <http://dx.doi.org/10.4202/app.2008.0107>

- [25] Kozłowska–Dawidziuk, A. 1995. Silurian retiolitids of the East European Platform. *Acta Palaeontologica Polonica* 40: 261–326
- [26] Kozłowska–Dawidziuk, A. 1997. Retiolitid graptolite *Spinograptus* from Poland and its membrane structures. *Acta Palaeontologica Polonica* 42: 391–412
- [27] Kozłowska–Dawidziuk, A. and Lenz, A.C. 2001. Evolutionary development in the Silurian Retiolitidae (Graptolites). *Journal of the Czech Geological Society* 46: 227–238
- [28] Kozłowska–Dawidziuk, A. 2002. *Agastograptus*, a synonym of *Plectograptus* (Retiolitidae, Graptolithina). *Acta Palaeontologica Polonica* 47: 459–467
- [29] Kozłowska–Dawidziuk, A. 2004. Evolution of retiolitid graptolites—a synopsis. *Acta Palaeontologica Polonica* 49: 505–518
- [30] Lenz, A.C. 1994. A sclerotized retiolitid, and its bearing on origin and evolution of Silurian retiolitid graptolites. *Journal of Paleontology* 68: 1344–1349
- [31] E. Porębska, A. Kozłowska-Dawidziuk, M. Masiak. The *lundgreni* event in the Silurian of the East European Platform, Poland. *Palaeogeography, Palaeoclimatology, Palaeoecology* Volume 213, Issues 3–4, 21 October 2004, Pages 271-294. <https://doi.org/10.1016/j.palaeo.2004.07.013>
- [32] Lapworth, C. 1873. On an improved classification of the Rhabdophora. *Geological Magazine* 10: 500–504, 555–560
- [33] Lapworth, C. 1876. On Scottish Monograptidae. *Geological Magazine* 13: 544–552
- [34] Lech Teller. The Silurian biostratigraphy of Poland based on graptolites. *Acta Geologica Polonica* Vol 19, No 3 (1969) 393-501