

About graptolite genus *Lithuanograptus* once more

Juozas Paškevičius

Vilnius University,
M. K. Čiurlionio St. 21/27,
LT-03101 Vilnius, Lithuania
E-mail juozas.paskevicius@gf.vu.lt

A new genus of graptolites named *Lithuanograptus* has been found in Lithuania and studied by the present author (Paškevičius, 1972, 1976) in the Silurian Llandovery cyphus zone of the Rasytė Formation and the following 4 species have been described: *L. fusiformis* Pašk., *L. obuti* Pašk., *L. minimus* Pašk. and *L. serus* Pašk. Loydell (1992) treated this genus as a junior synonym of *Metaclimacograptus* and attributed the species of *L. minimus* and *L. serus* to this genus. The author of the present paper agrees to the attribution of these species to the genus *Metaclimacograptus*. Nevertheless, a genotype *L. fusiformis* of *Lithuanograptus* and its species *L. fusiformis* and *L. obuti* differ significantly from *Metaclimacograptus* by fusiform rhabdosome, massive virgella and structure of thecae – a flattened geniculum surrounding and fully covering the thecal excavations, types of medial and intertheal septa and other features. Therefore, the author considers *Lithuanograptus* with *L. fusiformis* and *L. obuti* being separate genus and species. Moreover, the paper presents the holotypes of the mentioned two species with the material, diagnosis, age and detection sites.

Keywords: Silurian, Graptolites, *Metaclimacograptus*, *Lithuanograptus*

INTRODUCTION

Lithuanograptus, a new genus of graptolites has been detected, investigated and described by the author of the present paper (Paškevičius, 1972, 1976) in the Silurian Llandovery black argillites in the *cyphus* Zone Rasytė Formation. The diagnosis of its genotype *L. fusiformis* is given by Paškevičius as follows: a biserial fusiform rhabdosome, significantly narrowed proximal and less narrow distal portions, massive virgella, short bent sicula, exceptional structure of thecae with flattened wide genicular hoods (collars) surrounding the thecal excavations and fully covering them, straight supragenicular walls, usually undulating medial septum without angles, long and straight intertheal septa (Figure). Therefore, the author came to a conclusion that the genus *Lithuanograptus*, its genotype differs significantly from the genus *Me-*

taclimacograptus. While according to the author, 4 new species: *L. fusiformis* Pašk., *L. obuti* Pašk., *L. minimus* Pašk., and *L. serus* Pašk. of Llandovery cyphus-sedgwickii Zone should be attributed to the *Lithuanograptus* genus.

A British graptolite expert David K. Loydell (1992) wrote that the *Metaclimacograptus* genotype *Diplograptus hughesi* Nicholson, 1869 was notable for a widened geniculum significantly smaller than theca at the edge of every thecal aperture. Such widening of the geniculum can generate their morphology observed by J. Paškevičius in the Lithuanian and Estonian material. The British expert considers genus *Lithuanograptus* a junior synonym of *Metaclimacograptus*. Thus, Loydell (1992) attributed *L. minimus* and *L. serus* of the genus *Lithuanograptus* to the genus *Metaclimacograptus*. He had not analysed, however, the features of the genus genotype *Lithuanograptus fusiformis*.

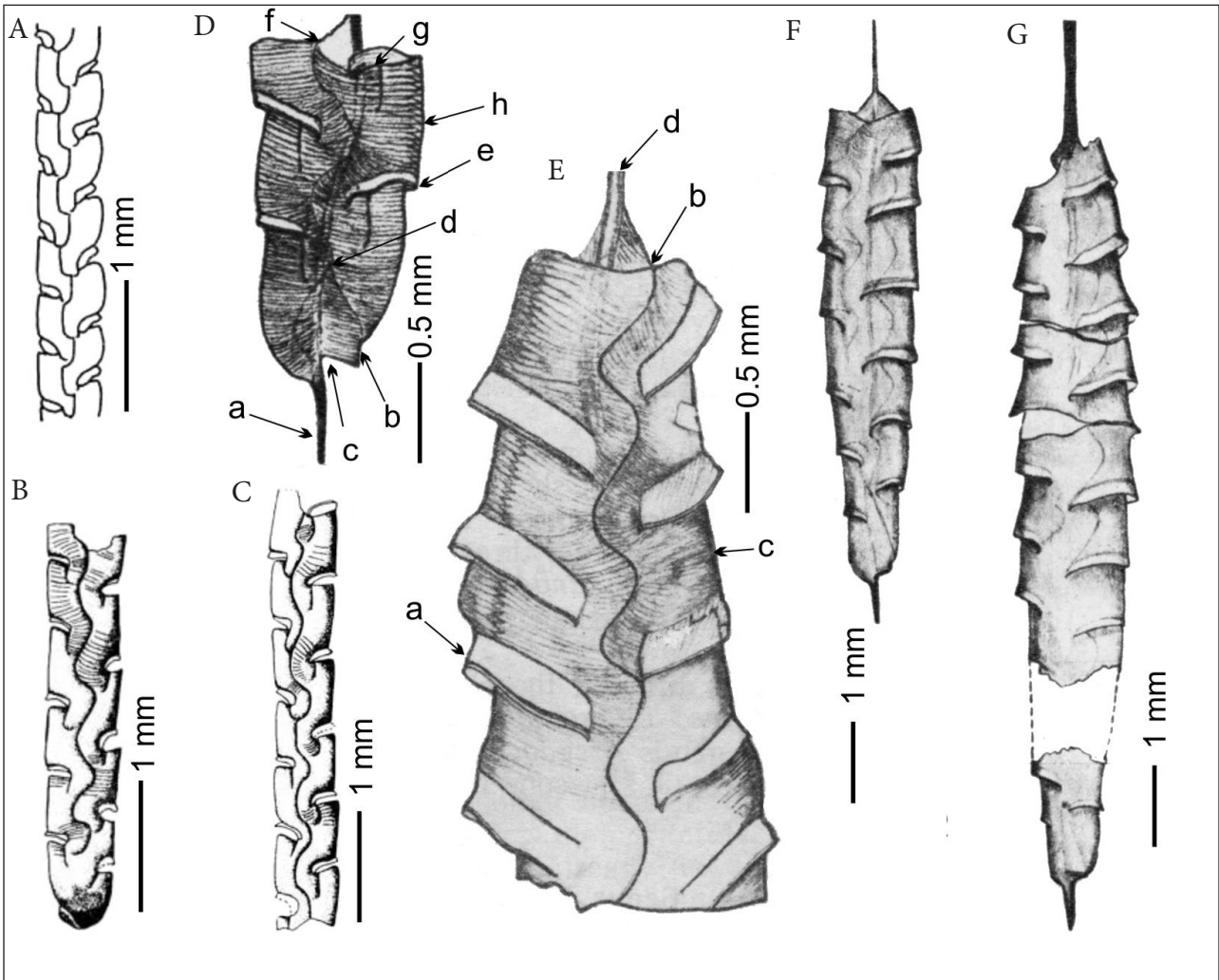


Figure. Comparison of *Metaclimacograptus* ir *Lithuanograptus* genera

A – a typical part of *Metaclimacograptus* rhabdosome and a type of thecae, B, C – *Metaclimacograptus hughesi* (Nich.) (Bulman and Rickards, 1968, text fig. 2c and text figs. 1a, b), D – lightened proximal part of *Lithuanograptus* specimen with sicula, its aperture (b, c) and apex (d), massive virgella (a), the primary thecae with hoods – geniculum (e), covering thecal excavations, undulating median septum (f) and nearly straight interthecal septa (g), dense fuselar sculpture (h), E – lightened distal part of *Lithuanograptus* with distinct thecal hoods-geniculum (a), usually without sharp angles undulating basic septum (b), straight walls of genicular thecae (c), F – intact *Lithuanograptus obuti* Pašk., and G – intact *L. fusiformis* Pašk. The rhabdosome of this species is slightly damaged, spindle-like shaped (fusiform) with greatly narrowing proximal part and less narrowing distal one, as well as massive virgella and virgula.

It should be noted that the thecal hoods or the geniculum are less developed in the species of *L. minimus* and *L. serus*, but all other rhabdosome attributes are closer to the genus *Metaclimacograptus*; therefore, the author supports the isolation made by Loydell (1992) and Loydell and Maltz (2009) of the above-mentioned species and agrees that these species are attributed to that genus.

COMPARISON OF LITHUANOGRAPTUS WITH METACLIMACOGRAPTUS

What are basic differences between the specimens of these genera? *L. fusiformis* (Paškevičius 1972, 1976), the genotype of *Lithuanograptus* genus differs from the *Metaclimacograptus* genus fundamentally. Firstly, in the shape of the rhabdosome which for *L. fusiformis* is spindle-like

shaped (fusiform) with a very narrow proximal part and less narrow distal part, while the width of the rhabdosomes for *Metaclimacograptus* are the same for the entire rhabdosome. *L. fusiformis* distinguishes by a massive straight virgella, short bent sicula. Secondly, it has quite different thecal structure – its rhabdosome has well developed thecal hoods, i.e. flattened geniculum fully surrounding the thecal excavations. While this geniculum in the *Metaclimacograptus* genotype *Diplograptus Hughesi* Nicholson is only of germinal shape and does not cover the thecal excavations, which are well seen. The edge of the geniculum in *Lithuanograptus* specimens has a narrow lip that is concave with the entire geniculum plane and slightly inclined towards the rhabdosome axis. This inclination is increasing towards the distal part, where this lip and entire geniculum is convex, which is not typical of *Metaclimacograptus* species. The supragenicular walls are straight, while they are slightly convex for *Metaclimacograptus* species. The median septum is undulating in zigzag shape, usually without sharp turns, angles, while this undulation is angular for *Metaclimacograptus* species. The interthecal septa are long, straight, while for *Metaclimacograptus* species they are short and bent, some even reach the median septum. The fuselar tissue is fine in the specimens of *Lithuanograptus* species.

Thus, the systematic attributes of *Lithuanograptus* species fundamentally differ from those of *Metaclimacograptus* (Bulman, Rickards, 1968; Loydell, 1992). Their comparison is given in Figure. Therefore the author reasonably considers *Lithuanograptus* a separate genus with two species *L. fusiformis* Pašk. and *L. obuti* Pašk. This had been recognised by Charles E. Mitchell (1987), an American expert in diplograptid evolution and phylogeny. This genus is younger than *Metaclimacograptus*, because *M. hughesi* (Nich.) appeared in the acinaces Zone, while the species of *Lithuanograptus* occur in the cyphus Zone; therefore, the latter species generated the formation of new systematic attributes. There is a phylogenetic link between these genera.

SUMMARY OF SPECIES OF *LITHUANOGRAPTUS* GENUS

Lithuanograptus fusiformis Paškevičius 1972,
1976 Figure, D–E, G

1972 *Lithuanograptus fusiformis* Paškevičius (Dis.), p. 91–93, pt. V, figs. 5–8, pl. XXI, figs. 4–11, text figs. 77, A–B.

1976 *Lithuanograptus fusiformis* Paškevičius, p. 142–144, pl. I, figs. 5–8, pl. II, figs. 4–11.

1979 *Lithuanograptus fusiformis* Paškevičius, p. 112–113, pl. I, figs. 6–8, pl. II, figs. 5–8, pl. XVI–II, figs. 9–14, pl. XIX, figs. 2–4.

Holotype G8/359, Figure. G, Lithuania, Párovėja-9 borehole, Silurian, Llandovery, cyphus Zone, Rasytė Formation.

Material. The collection contains several intact and damaged rhabdosomes from 5 detection sites, some of them are lightened.

Diagnosis. The rhabdosome is biserial, spindle-like shaped (fusiform), more thinner in the proximal part and less in distal part, to 9 mm long, the width at the first pair of the thecae is 0.7 mm, and the largest width is at the seventh pair of thecae and makes 1.9 mm. The prevailing width is 1.2 mm. A short 1 mm long bent sicula doesn't reach the edge of the hood (geniculum) covering the 1st theca, virgella is massive and straight.

Well-developed on the entire rhabdosome, large thecal hoods, flattened geniculum, surround the rhabdosome as small bands and cover thecal excavations as well as infragenicular walls, which do not reach the centre of the rhabdosome. At the edge of the geniculum there is a narrow lip that, together with the flattened geniculum, is concave in the proximal part and convex and slightly inclined towards the rhabdosome axis at its distal part; this inclination is increasing towards the distal part. Supragenicular walls are long and straight. The median septum is undulating, usually without sharp turns, angles. Interthecal septa are long and straight. Fuselar tissue is fine. On the length of 5 mm, there are 8–6.5 thecae. For a detailed description see Paškevičius (1976).

Age. Llandovery, cyphus Zone, Rasytė Formation black and dark grey argillites. (Paškevičius et al., 1994).

Detection sites. Boreholes in Lithuania: Párovėja-9, depth 721.0 meters, G8/359, holotype, G8/360, G8/361, G8/362, 722.0 meters, G8/0149, G8/0154; Kunkojai-12, depth 1380.35 meters, G8/363; Naujoji Akmenė-71, depth 1367.5 meters; Kaliningrad Oblast: Gusevo-7, depth 1522 meters, G8/0144; Estonia: Ikla, depth 469.1 meters, G8/0147.

***Lithuanograptus obuti* Paškevičius, 1972, 1976**

Figure, F 1972 *Lithuanograptus obuti* Paškevičius, (Dis.), p. 93, pl. 5, figs. 9–10, pl. XXXI, figs. 12–14.

1976 *Lithuanograptus obuti* Paškevičius, p. 144, pl. I, figs. 9–10, pl. II, figs. 12–15.

1979 *Lithuanograptus obuti* Paškevičius, p. 113, pl. I, figs. 6, 10–11, pl. II, figs. 11–14, pl. XIX, figs. 12–16.

Holotype G8/366, Figure: F, Lithuania, Kun-kojai-12 borehole, Silurian, Llandovery, cyphus Zone, Rasytė Formation.

Material. Several intact and damaged rhabdosome specimens from two detection sites.

Diagnosis. The rhabdosome is spindle-like shaped (fusiform) with the narrowing proximal part, small, 5–8 mm long; its width at the first thecal pair is 0.65–0.80 mm and increasing further reaches 1.0–1.1 mm at the fifth thecal pair. Sricula is longer than that of *L. fusiformis* and reaches 0.9 mm, its apex is at the edge of the 2¹ thecal geniculum. The virgella is shorter than that of *L. fusiformis* and less massive. The geniculae are flattened; their bands are less developed, narrower; although being obscure the lip covers fully the longer excavations of thecae and reaches the centre of the rhabdosome. Their lateral edges are convex on the entire rhabdosome. The supragenicular walls are straight or slightly convex. The median septum is, as a rule, undulating, the interthecal septa are obscure. On the length of 5 mm, there are 7 thecae. For a detailed description see Paškevičius (1976).

Age. Llandovery, cyphus Zone, Rasytė Formation black and dark grey argillites.

Detection sites, boreholes in Lithuania: Kun-kojai-12, depth 1380.55 meters, G8/364, G8/365, 1380.35 meters, G8/366, holotype, G8/367; Stačiūnai-8, depth 1255.75 meters, G8/368.

ACKNOWLEDGEMENTS

The author is grateful to Dr. Sigitas Radzevičius for help of the text figure computer preparation.

Received 3 April 2017

Accepted 12 June 2017

REFERENCES

1. Bulman O. M. B., Rickards R. B. 1968. Some new diplograptids from the Llandovery of Britain and Scandinavia. *Palaeontology*. 11(1): 1–15.
2. Loydell D. K. 1992, 1993. *Upper Aeronian and Lower Telychian (Llandovery) Graptolites from Western Mid-Wales*. Monograph of the Palaeontographical Society. London. Part 2, 1–180, pl. 1–5.
3. Loydell D. K. and Maletz J. 2009. Isolated Graptolites from the *Lituigraptus convolutus* biozone (Silurian, Llandovery) of Dalarna, Sweden. *Palaeontology*. 52(2): 273–296.
4. Mitchell C. E. 1987. Evolution and Phyllogenetic classification of the Diplograptacea. *Palaeontology*. 30(2): 353–405.
5. Paškevičius J. 1972. *Biostratigrafiya, koreliaciya i graptolity ordovikskich i siluriskich otlozhenii Juzhnoy Pribaltiki*. Dis. doktora geol.-miner.nauk. Vilnius, t. I, 399 s. t. II, 351 s., paleontol. tabl. 100 s. [in Russian].
6. Paškevičius J. 1973. *Biostratigrafiya, koreliaciya i graptolity ordovikskich i siluriskich otlozhenii Juzhnoy Pribaltiki*. Autoref. dis. na soiskanie uch. stepeni dr. geol.-miner. n. Vilniuskij universitet. 67 s. [in Russian].
7. Paškevičius J. 1976. On some new Llandoveryan diplograptids of the Eastern Baltic. Kaljo D., Koren T. (eds.). *Graptolites and Stratigraphy*. Tallinn. 140–151.
8. Paškevičius J. 1979. *Biostratigrafiya i graptolity silura Litvy*. Vilnius: Mokslas. 268 p. [in Russian].
9. Paškevičius J., Lapinskas P., Brazauskas A., Musteikis P., Jacyna J. 1994. Stratigraphic revision of the Regional Stage of the Upper Silurian part in the Baltic Basin. *Geologija*. 17: 64–87.

Juozas Paškevičius

DAR KARTĄ APIE GRAPTOLITŲ GENTĮ
LITHUANOGRAPTUS

S a n t r a u k a

Nauja graptolitų gentis *Lithuanograptus* Lietuvoje buvo atrasta ir ištirta autoriaus (Paškevičius, 1972; 1976) silūro sistemoje, landoverio skyriuje, cyphus zonoje, Rasytės svitoje. Jos sudėtyje buvo aprašytos 4 rūšys: *L. fusiformis*, *L. obuti*, *L. minimus* ir *L. serus*. D. K. Loydellis (1992) šią gentį palaikė jaunesniu *Metaclimacograptus* genties sinonimu ir jai priskyrė *L. minimus* ir *L. serus* rūšis. Autorius pritaria šių rūšių priskyrimui *Metaclimacograptus* genčiai, tačiau *Lithuanograptus* genotipas *L. fusiformis* ir šios genties rūšys *L. fusiformis* ir *L. obuti* iš esmės skiriasi nuo *Metaclimacograptus* genties verpstės pavidalo rabdosoma, masyvia, tiesia virgela, tekų struktūra – suplokštėjusiu genikulumu, apjuosiančiu ir visai užden-giančiu tekų ekskavacijas, medialinių ir tarptekinių se-ptų pobūdžiu bei kitais požymiais. Todėl *Lithuanograptus* gentį su *L. fusiformis* ir *L. obuti* rūšimis autorius laiko savarankiška gentimi ir rūšimis. Be to, straipsnyje pa-teikta minėtų dviejų rūšių santrauka: holotipai, medžia-ga, diagnozė, amžius ir radimvietės.

Raktažodžiai: silūras, graptolitai, *Metaclimacograp-tus*, *Lithuanograptus*