

# *Linguagnostus groenwalli* Kobayashi, 1939 (Trilobita, Middle Cambrian) from erratics in Denmark

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*Linguagnostus groenwalli* Kobayashi, 1939 occurs very sparsely in the Middle Cambrian *Ptychagnostus punctuosus* Zone of Scandinavia and only six specimens have been described so far (three from *in situ* strata, three from erratic boulders). Additional well-preserved specimens found in two erratic boulders in Denmark are described; the material probably originates from the Bornholm area. The new findings indicate that the species locally is more common than previously documented. A lectotype is designated and refigured.

**Keywords:** Trilobite, agnostid, Middle Cambrian, Denmark

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One cephalon and seven pygidia of this rare agnostid trilobite are described. The new material was obtained from two ice-rafted erratic boulders in Denmark. The specimens are better preserved than most of the hitherto described material from Scandinavia, Siberia and Greenland. Up till now only three pygidia of this species have been reported from Scandinavia. Two pygidia were found by Grönwall (1902) in the Middle Cambrian *Ptychagnostus punctuosus* Zone of Bornholm, Denmark, and one pygidium by Westergård (1946) within the same zone in a drill-core from S. Sandby, Scania, Sweden. Additional material from glacial erratic boulders of northern Germany, comprising two somewhat damaged pygidia and one damaged cephalon, were figured by Rudolph (1994) and Buchholz (1997). All erratic finds derive from the *Ptychagnostus punctuosus* Zone, and the accompanying fauna indicates that they originated from the Bornholm area. Outside Scandinavia the species occurs in the *Anopolenus henrici* Zone of Siberia (Pokrovskaya, 1960; Egorova *et al.*, 1982). This level approximately corresponds to the *Hypagnostus parvifrons* and *Ptychagnostus punctuosus* zones of Scandinavia. The species has also been found on Greenland in the upper part of the *Ptychagnostus atavus* Zone (Robison, 1994), which corresponds approximately to the *Hypagnostus parvifrons* Zone of Scandinavia.

## *Linguagnostus groenwalli* Kobayashi, 1939

Figs 1, 2.

- 1902 *Aagnostus kjerulfi* Brögger, Grönwall, pp. 69–70, pl. 1, fig. 11
- 1939 *Linguagnostus kjerulfi* forma *groenwalli*, Kobayashi, pp. 142–143
- 1946 *Linguagnostus groenwalli* Kobayashi, 1939, Westergård, pp. 63–64, pl. 8, figs 30 a, b
- 1960 *Linguagnostus groenwalli* Kobayashi, 1939, Pokrovskaya *in* Chernysheva, pl. 1, fig. 5
- 1982 *Linguagnostus groenwalli* Kobayashi, 1939, Egorova *et al.*, p. 62, pl. 12, fig. 3; pl. 14, fig. 6; pl. 16, figs 11, 12
- 1994 *Linguagnostus groenwalli* Kobayashi, 1939, Rudolph, pp. 144–145, pl. 9, figs 18, 19
- 1994 *Linguagnostus groenwalli* Kobayashi, 1939, Robison, pp. 34–35, fig. 10
- 1997 *Linguagnostus groenwalli* Kobayashi, 1939, Buchholz, p. 242, pl. 18, fig. 3

**Lectotype** (designated here). – Pygidium MGUH 28386, originally illustrated by Grönwall (1902, pl. 1, fig. 11). The pygidium, originating from the *Ptychag-*

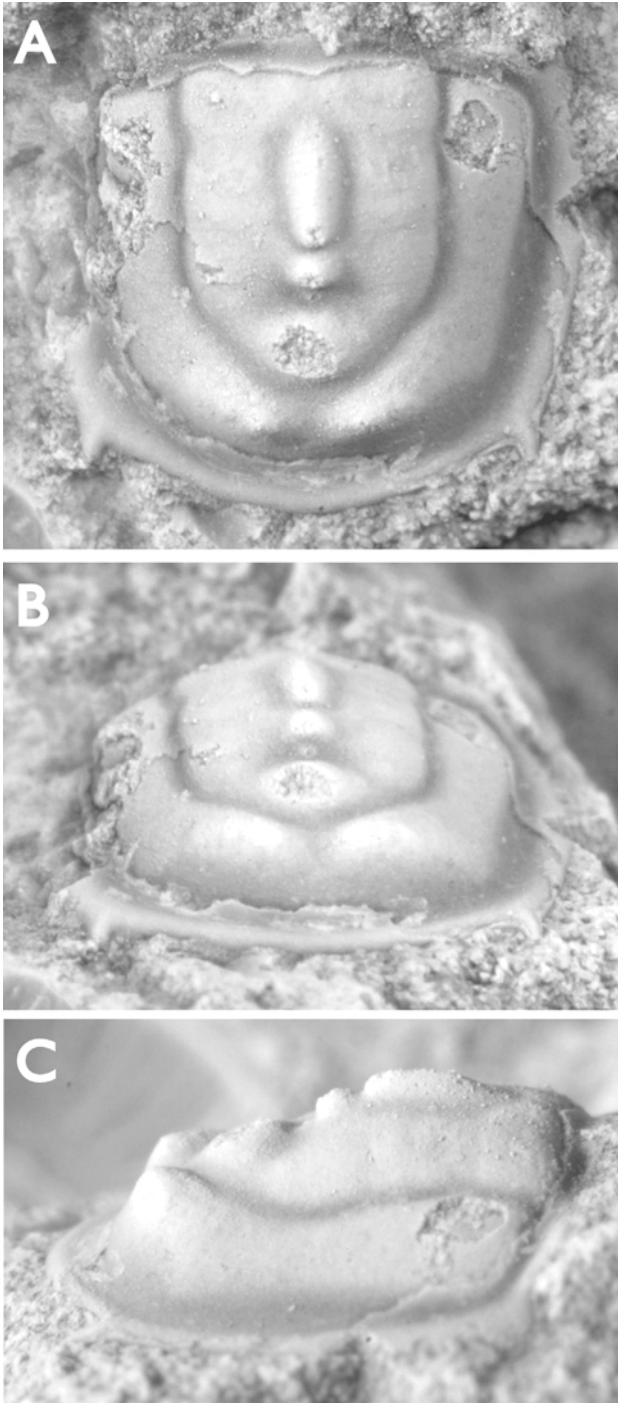


Fig. 1. *Linguagnostus grönwalli* Kobayashi, 1939. Lectotype pygidium from Kalby, Læså, Bornholm, Denmark, X 18. Original of Grönwall (1902, pl. 1, fig. 11). The specimen is now deposited at the Geological Museum, Copenhagen. MGUH 28386. A. Dorsal view, B. Oblique side view, C. Oblique posterior view.

*nostus punctuosus* Zone at Kalby, Læså, Bornholm, is re-figured in Fig. 1.

*New material.* – One cephalon and seven pygidia from two ice-rafted boulders found at Asnæs cliff (south-west of Kalundborg, western Sjælland, UTM32 ETRS89 6169597N 624224E) and Ålehoved cliff (south of Middelfart, western Fyn, UTM32 ETRS89 6140849 N 549900E), Denmark. The erratics, consisting of bituminous limestone (orsten), presumably originated from the Bornholm area, Denmark.

*Zone.* – *Ptychagnostus punctuosus* Zone of the *Paradoxides paradoxissimus* Superzone, Middle Cambrian.

*Accompanying fauna.* – The Asnæs cliff boulder also contained *Onymagnostus altus* (Grönwall, 1902), *Onymagnostus stenorrhachis* (Grönwall, 1902), *Cotalagnostus lens* (Grönwall, 1902) and *Hypagnostus mammillatus* (Brögger, 1878). The pygidium of the Ålehoved cliff boulder was associated with *Ptychagnostus punctuosus* (Angelin, 1851), *Doryagnostus incertus* (Brögger, 1878) and *Diplorrhina quadrata* (Westergård, 1946).

*Diagnosis.* – See Robison (1994).

*Remarks.* – This rare species was originally based on two pygidia from the Middle Cambrian *Ptychagnostus punctuosus* Zone at Læså, Bornholm, erroneously assigned to *Aagnostus kjerulfi* by Grönwall (1902). Only one specimen was illustrated; it is here designated as lectotype and refigured (Fig. 1). The whereabouts of the second specimen is unknown; it could not be located in the collections of Geological Survey of Denmark and Greenland or the Geological Museum, University of Copenhagen.

The newly collected cephalon (Fig. 2:A) from the Asnæs boulder (4.4 mm wide, 3.6 mm long) corresponds well with the specimens figured from Siberia. The Danish and Siberian material differ from the cephalata reported from Greenland by lacking an an-

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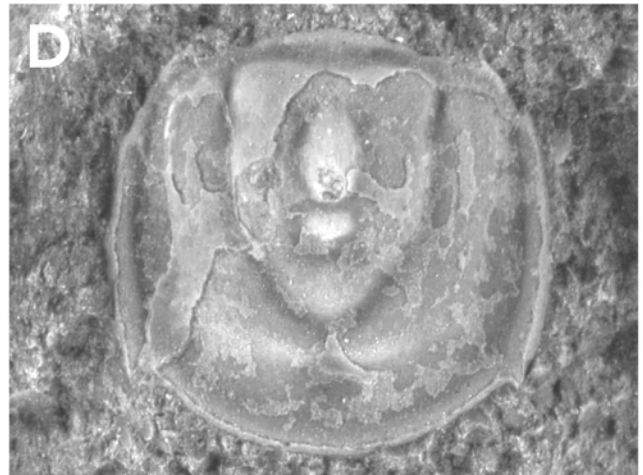
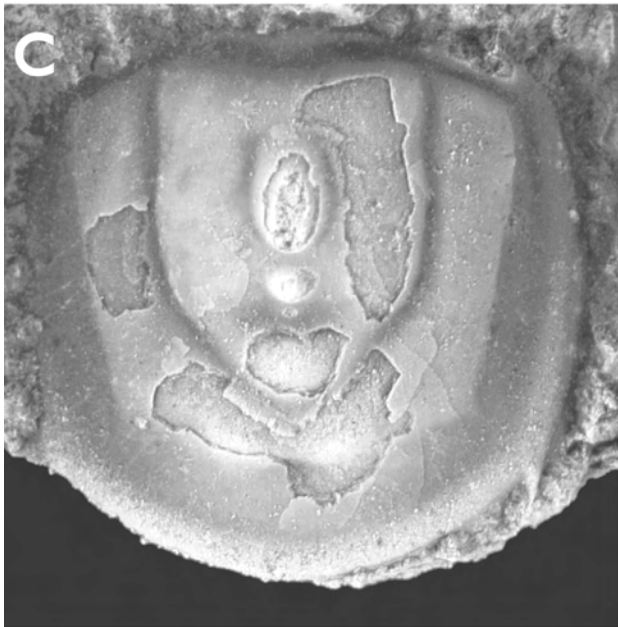
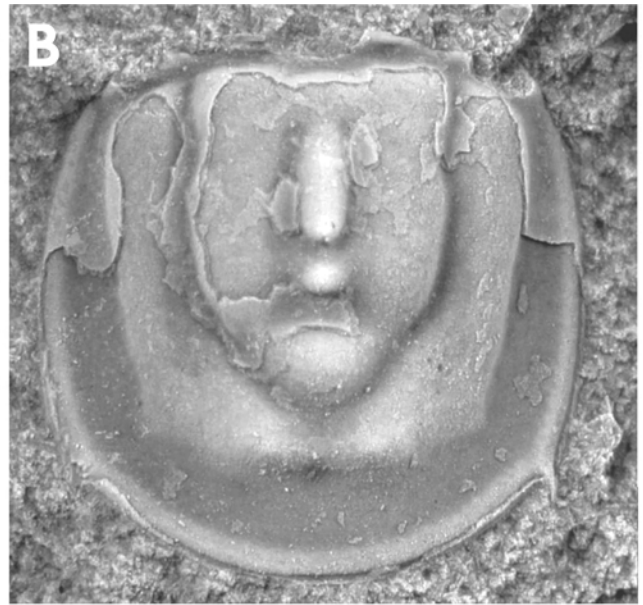
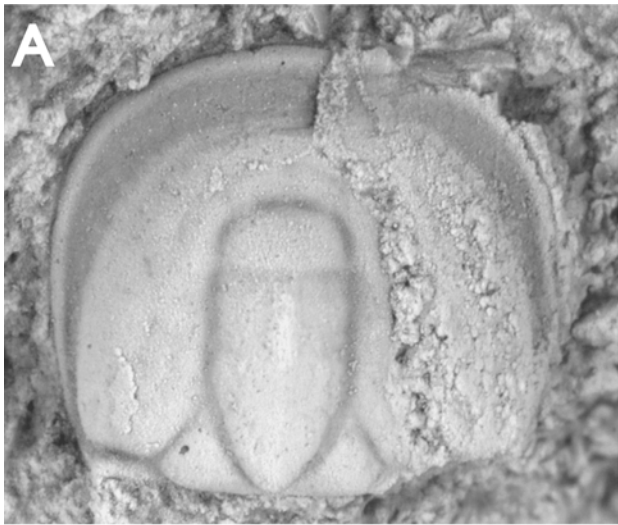
Figure 2. *Linguagnostus grönwalli* Kobayashi, 1939. The specimens derive from two ice-rafted boulders. The illustrated material is deposited at the Geological Museum, Copenhagen.

A. Cephalon from the Ålehoved cliff boulder, Fyn, Denmark, X 18. MGUH 28387.

B-E. Pygidia from the Ålehoved cliff boulder, Fyn, Denmark, X 18. B: MGUH 28388, C: MGUH 28389, D: MGUH 28390, E: MGUH 28391.

F. Pygidium with zonate pygidial border, Asnæs cliff boulder, Sealand, Denmark, X 18. MGUH 28392.





teroglabellar cleft and the anteroglabella seems to be slightly longer. The six pygidia from the Asnæs boulder (four are shown in Fig. 2:B–E) strongly resemble the small pygidia previously described from Bornholm, Sweden, German erratics and Siberia. They are all slightly wider than long (between 3.2 to 4.6 mm wide and 3.0 to 4.1 mm long), show a triangular, pointed end of the posteroaxis and a distinct to moderately developed postaxial median furrow. The larger pygidium from the Ålehoved boulder (Fig. 1:F) differs slightly and resembles the larger specimens described from Greenland. Besides being larger (4.8 mm wide, 4.2 mm long), the posteroaxis ends triangulate and rounded, the postaxial median furrow is weakly impressed or rather a depression, and a pygidial collar is well-developed. Robison (1994) considered the last mentioned feature characteristic of late holaspids; it is important for the generic assignment (cf. Robison 1994, p. 35). The large pygidium from Ålehoved is the first Scandinavian specimen of *L. groenwalli* that compares well with the Greenlandic material described by Robison (1994).

With six pygidia and one cephalon occurring within a single, small erratic block (Asnæs boulder) this trilobite seems to be more frequent locally than indicated by the sparse occurrences reported in the literature.

The illustrated material is deposited at the Geological Museum, Copenhagen. The accompanying fauna comprises common, well-known species and is mostly not preserved (the specimens were destroyed in the search for additional specimens of *L. groenwalli*) except for a pygidium of *Onymagnostus altus*, which will be treated in a forthcoming paper and eventually also stored at the Geological Museum.

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Comments by reviewers Euan Clarkson and Jan-Ove Ebbestad improved the original manuscript. Karsten Holm and Bjørn Have Christensen, Geological Survey of Denmark and Greenland, are thanked for help retrieving the material published by Grönwall (1902), stored at the survey.

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