

Bothriolepis (Placodermi, Arthrodira) from Iveragh Peninsula (Ireland) - CT-Data, 3D-Models, and Phylogenetic Analyses Files

SND-ID: 2022-247-1. **Version:** 1. **DOI:** <https://doi.org/10.57804/8y8t-kr41>

Download data

1-SEM (elemental analysis)/Vincent Dupret_EDS (SEM chemical elements tracking).zip (6.01 MB)
2-CT_DATA/CTstack-NHMP59677.zip (8.83 GB)
2-CT_DATA/CTstack-NHMP59678.zip (6.73 GB)
2-CT_DATA/CTstack-NHMP59679.zip (4.64 GB)
2-CT_DATA/CTstack-NHMP59687.zip (6.37 GB)
2-CT_DATA/CTstack-NMING-F35203-UU201ab_HQ.zip (163.27 MB)
2-CT_DATA/CTstack-NMING-F35216-UUSFB001b.zip (493.22 MB)
2-CT_DATA/CTstack-NMING-F35229-CH003.zip (258.36 MB)
3-SEGMENTATION/DRISHTI/NMING-F35203-UU201ab_HQ.zip (157.02 MB)
3-SEGMENTATION/MIMICS/NHMP59677-originals.mcs (5.86 GB)
3-SEGMENTATION/MIMICS/NHMP59677-relocated.mcs (5.87 GB)
3-SEGMENTATION/MIMICS/NHMP59678.mcs (1.61 GB)
3-SEGMENTATION/MIMICS/NHMP59679.mcs (1.49 GB)
3-SEGMENTATION/MIMICS/NHMP59687.mcs (1.38 GB)
3-SEGMENTATION/MIMICS/NMING-F35203-UU201ab_HQ.mcs (80 MB)
3-SEGMENTATION/MIMICS/NMING-F35216-UUSFB001b.mcs (445 MB)
3-SEGMENTATION/MIMICS/NMING-F35229-CH003.mcs (250 MB)
4-STLs/NHMP59677.zip (2.33 GB)
4-STLs/NHMP59678.zip (487.61 MB)
4-STLs/NHMP59679.zip (276.58 MB)
4-STLs/NHMP59687.zip (107.47 MB)
4-STLs/NMING-F35203-UU201ab_HQ.zip (17.51 MB)
4-STLs/NMING-F35216-UUSFB001b.zip (102.27 MB)
4-STLs/NMING-F35229-CH003.zip (43.49 MB)
5-3D_PDFS/NHMP5967.pdf (153.68 MB)
5-3D_PDFS/NHMP59677_ORG.pdf (279.99 MB)
5-3D_PDFS/NHMP59677_ORG+RELOC.pdf (676.63 MB)
5-3D_PDFS/NHMP59677_RELOC.pdf (396.09 MB)
5-3D_PDFS/NHMP59678.pdf (154.48 MB)
5-3D_PDFS/NHMP59687.pdf (59.6 MB)
5-3D_PDFS/NMING-F35203-UU201ab_HQ.pdf (14.7 MB)
5-3D_PDFS/NMING-F35216-UUSFB001b.pdf (51.77 MB)
5-3D_PDFS/NMING-F35229-CH003.pdf (9.37 MB)

6-PHYLOGENY/phylogenetic analyses.zip (78.75 MB)

Associated documentation

S2 table - scan properties.xlsx (11.01 KB)

Download all files

2022-247-1-1.zip (~49.77 GB)

Citation

Dupret, V. (2022) Bothriolepis (Placodermi, Arthrodira) from Iveragh Peninsula (Ireland) - CT-Data, 3D-Models, and Phylogenetic Analyses Files (Version 1) [Data set]. Uppsala University. Available at: <https://doi.org/10.57804/8y8t-kr41>

Creator/Principal investigator(s)

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Research principal

[Uppsala University](#) - Department of Organismal Biology

Description

The current data set refers to the study of fossil fish material from Southwest Ireland (Placodermi, Antiarchi; Givetian of the Iveragh Peninsula). The data consist of SEM elemental mapping (section 1), CTscan image stacks and subsequent working files (i.e. segmentation, visualisation files, STLs and 3D PDF files; sections 2-5), as well as phylogenetic analyses related to the genus Bothriolepis studied in the article (section 6).

* Zoobank LSID for article: urn:lsid:zoobank.org:pub:0438B3D4-AEAA-4000-A1CB-B5DA0ECA466F

* Zoobank LSID for taxon Bothriolepis dairbhrensis:
urn:lsid:zoobank.org:act:B577F075-1EF6-48A5-8C7C-E64E36E2BC4E

The dataset corresponding to the article

Dupret, Byrne, Castro, Hammer, Higgs, Long, Niedźwiedzki, Qvarnström, Stössel & Ahlberg. In Press. The Bothriolepis (Placodermi, Antiarcha) material from the Valentia Slate Formation of the Iveragh Peninsula (middle Givetian, Ireland): morphology, evolutionary and systematic considerations, phylogenetic and palaeogeographic implications. PLOS ONE.

with the LSID urn:lsid:zoobank.org:pub:0438B3D4-AEAA-4000-A1CB-B5DA0ECA466F

and the species Bothriolepis dairbhrensis Dupret, Byrne, Castro, Hammer, Higgs, Long, Gzegorz Niedźwiedzki, Qvarnström, Stössel & Ahlberg

with the LSID urn:lsid:zoobank.org:act:B577F075-1EF6-48A5-8C7C-E64E36E2BC4E

is composed of the following files:

1. Elemental analysis (SEM)

equipment: Hitachi S-3600N Scanning Electron Microscope (SEM); JPGS are original output.

2. CT-scans datasets

In London, the material was CT-scanned with a Nikon HMX ST 225 system, Nikon Metrology, Leuven, Belgium, with a tungsten reflection target. Detailed settings files were adjusted for each specimen

and are given in associated documentation "S2 Table-scan properties.xlsx". Two specimens required stitching performed with an in-house NHM script written in Octave. In Oslo, the scanning was carried out with a Nikon Metrology XT H 225 ST microfocus CT instrument at the Natural History Museum, University of Oslo, at 160-220 kV, 1 s exposure time, 3016 projections, and with tin filters of varying thickness. Voxel resolution was 75 µm or better. Detailed settings are given in associated documentation "S2 Table-scan properties.xlsx".

3. Drishti and Mimics files (segmentation)

4. STL files

5. 3D pdfs

In Mimics, each individual structure corresponding to a mask was used to generate a high quality 3D object, itself transformed into an STL file. Each 3D object was duplicated and relocated in the 3D space; once again STLs were generated. The STL files were then imported into Materialise 3-matic (v. 15.0) and were reorganised into anatomical ensembles (head, fin, etc.) in both original and correct positions. Each STL surface was then simplified and corrected using the following functions: Filter Sharp Triangles with filter distance 0.01; Filter Small Edges with filter distance 0.01; Improve Mesh with shape quality high/medium, maximum geometrical error 0.07, and maximal edge length 20.0. A 3D pdf file was finally generated and open in Adobe Acrobat to take pictures used in figures of the current article.

for the following specimens

a. NMING:F35203-UU210ab_HQ

Bothriolepis dairbhrensis sp. nov. Incomplete lateral plate and fragment of indeterminate plate. Segmentation in Mimics, treatment of STLS and 3d PDF exportation in 3-matic. The scale of the reference cube edges is 10 mm.

Please note that within the Mimics project files for this specimen µm is incorrectly given as a base of measurement when it should be mm (millimeters). All other processing has been performed treating the source data as being scaled in millimeters.

b. NMING:F35229-CH003

Bothriolepis dairbhrensis sp. nov. Assemblage of indeterminate plate and indeterminate scavenging gastropods. Segmentation in Mimics, treatment of STLS and 3d PDF exportation in 3-matic. The scale of the reference cube edges is 10 mm.

c. NMING:F35216-UU SFB001

Bothriolepis dairbhrensis sp. nov. Proximal segment of the pectoral fin, with AVL and articular condyle. [ORG] corresponds to plates in original position; [RELOC] corresponds to plates relocated in life position. Segmentation in Mimics, treatment of STLS and 3d PDF exportation in 3-matic. The scale of the reference cube edges is 10 mm.

d. NHM P 59677 (complete, ORG end RELOC files)

Bothriolepis dairbhrensis sp. nov. Incomplete head (and endocranial processes), ventral body armour and proximal segment of the pectoral fin. [ORG] corresponds to plates in original position; [RELOC] corresponds to plates relocated in life position. Segmentation in Mimics, treatment of STLS and 3d PDF exportation in 3-matic. The scale of the reference cube edges is 10 mm.

e. NHM P 59678

Bothriolepis dairbhrensis sp. nov. Incomplete lateral and indeterminate plates of an adult individual.

The scale of the reference cube edges is 10 mm.

f. NHM P 59679

Bothriolepis dairbhrensis sp. nov. Two indeterminate fragments. The scale of the reference cube edges is 10 mm.

g. NHM P 59687

Bothriolepis dairbhrensis sp. nov. Indeterminate fragments and burrows. The scale of the reference cube edges is 10 mm.

6. taxon*character matrices with different sets of analyses (readable in MESQUITE)

****LINKS TO PREVIOUSLY MENTIONED SOLUTIONS****

MESQUITE (construction of data matrix, visualisation):

<https://www.mesquiteproject.org/>

<https://github.com/MesquiteProject/>

Maddison, W. P. and D.R. Maddison. 2021. Mesquite: a modular system for evolutionary analysis. Version 3.70 <http://www.mesquiteproject.org>

ZEPHYR (Mesquite package for interacting with external phylogeny inference programs)

<http://zephyr.mesquiteproject.org/>

Maddison, D.R., & W.P. Maddison. 2021. Zephyr: a Mesquite package for interacting with external phylogeny inference programs. Version 3.20. <http://zephyr.mesquiteproject.org>

TNT (phylogenetic analysis)

<https://onlinelibrary.wiley.com/doi/10.1111/j.1096-0031.2008.00217.x>

Goloboff, P.A., Farris, J.S. and Nixon, K.C. (2008), TNT, a free program for phylogenetic analysis. *Cladistics*, 24: 774-786. <https://doi.org/10.1111/j.1096-0031.2008.00217.x>

MATERIALISE MIMICS and 3-MATIC (segmentation, 3D modelling):

<https://www.materialise.com/en/healthcare/mimics-innovation-suite>

DRISHTI (3D visualisation):

<https://github.com/nci/drishti>

Ajay Limaye; Drishti: a volume exploration and presentation tool. Proc. SPIE 8506, Developments in X-Ray Tomography VIII, 85060X (October 17, 2012)

Data contains personal data

No

Language

[English](#)

Data format / data structure

[Numeric](#)

[Text](#)

[Still image](#)

[3D](#)

[Other](#)

Species and taxons

[Bothriolepis dairbhrensis](#)

Geographic spread

Geographic description: Valentia Slate Formation, Iveragh Peninsula, Ireland

Responsible department/unit

Department of Organismal Biology

Funding 1

- Funding agency: European Research Council (ERC)
- Funding agency's reference number: ERC-2020-ADG 101019613

Funding 2

- Funding agency: Knut and Alice Wallenberg Foundation

Research area

[Geology](#) (Standard för svensk indelning av forskningsämnen 2011)

[Zoology](#) (Standard för svensk indelning av forskningsämnen 2011)

[Other natural sciences not elsewhere specified](#) (Standard för svensk indelning av forskningsämnen 2011)

Keywords

[Phylogeny](#), [Palaeogeography](#), [Devonian](#), [Stratigraphy](#), [Systematics](#), [Valentia island](#), [Placoderm](#), [Bothriolepis](#), [Antiarchi](#), [Givetian](#)

Publications

Dupret, Byrne, Castro, Hammer, Higgs, Long, Niedźwiedzki, Qvarnström, Stössel & Ahlberg. 2023. The *Bothriolepis* (Placodermi, Antiarcha) material from the Valentia Slate Formation of the Iveragh Peninsula (middle Givetian, Ireland): morphology, evolutionary and systematic considerations, phylogenetic and palaeogeographic implications. PLOS ONE. 18(2): e0280208.

<https://doi.org/10.1371/journal.pone.0280208>

LSID urn:lsid:zoobank.org:pub:0438B3D4-AEAA-4000-A1CB-B5DA0ECA466F

DOI: <https://doi.org/10.1371/journal.pone.0280208>

URN: urn:lsid:zoobank.org:pub:0438B3D4-AEAA-4000-A1CB-B5DA0ECA466F

Point (Lon/Lat)

-10.332384, 51.841065

Polygon (Lon/Lat)

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-10.318433, 51.935768

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-10.356883, 51.927724
-10.380228, 51.91756
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-10.435158, 51.882818
-10.411126, 51.879003
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-10.391901, 51.866709
-10.393274, 51.857804
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-10.380228, 51.878156
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-10.280669, 51.899345
-10.26831, 51.906547
-10.281355, 51.92857

Accessibility level

Access to data through SND

Data are freely accessible

Use of data

[Things to consider when using data shared through SND](#)

Versions

Version 1. 2022-12-29

This resource has the following relations

Requires [Mesquite: a modular system for evolutionary analysis](#)

Requires [Drishti: a volume exploration and presentation tool](#)

Requires [Zephyr: a Mesquite package for interacting with external phylogeny inference programs](#)

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[DDI 2.5](#)

[DDI 3.3](#)

[DCAT-AP-SE 2.0](#)

[JSON-LD](#)

[PDF](#)

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[File overview \(CSV\)](#)

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