# Ichthyosauromorph Taxonomy

Benjamin Moon

Version 0.6.1756.20220214

#### **Contents**

```
Introduction
    Layout of synonymy lists
    'Richter symbols' & certainty of assignment
    Life Science Identifiers (LSID)
    Links in this document
List of Species
    Ichthyosauromorpha
    Hupehsuchia
    Ichthyosauriformes
References
            12
```

#### Introduction

This document presents a list of valid ichthyosauromorph species. It is a constant work in progress given the pace at which new ichthyosaur research happens. Perhaps not as rapidly as some other fossil groups, but certainly fast enough to require some attention.

It's also intended to give some handle on the vast literature available for ichthyosaurs and their near relatives by means of synonymy lists. I've chosen this format for it's familiarity, but also because I rather enjoy the process and trials to building a complete yet usable synonymy list.

I've used this also as an exercise in typography – like much of my more public output. This document is typeset in LuaLATEX using typefaces with various nice features - old style figures, small capitals, optical sizes. The fonts used are nonetheless open source, courtesy of their development at Adobe.

## Layout of synonymy lists

The synonymy lists are presented as unruled tables:

Example

```
Cartorhynchus lenticarpus Motani et al., 2015a
```

URN:LSID:ZOOBANK.ORG:ACT:FCCC9BB7-FD52-42F4-B2EC-B0B7E2A1CA32

```
<status> <year>
                <Taxon> <Authority, Year>
       2015a
```

<reference, page> [<occurrence information>.] <comments> Cartorhynchus lenticarpus Motani et al., 2015a Motani et al. p 485 [Upper Member, Nanlinghu Formation, Subcolumbites Ammonite Biozone (Olenekian, Lower Triassic, Triassic); Majishan Quarry, Chaohu City, Hefei, China (UTM WGS84 50R 577953 3499041 = 31° 37′ 26″ N 117° 49′ 19″ E).] LSID: URN:LSID:ZOOBANK.ORG:PUB:9CFFEE63-2B8A-4C01-B9C7-CD3C53D684F5

If a work names a new species or combination, the LSID of the act is included as a link button alongside the taxon name, where this is available. Similarly all works that have publication LSIDs have those included too.

'Richter symbols' & certainty of assignment

I've followed the recommendations of Matthews (1973), pretty much to the letter, for the symbols and styles included in the leftmost two columns.

In front of the year symbols in the leftmost column

- \* (asterisk) this publication marks the name becoming valid under ICZN rules.
- . (dot/period) we accept responsibility for attaching this reference to the taxon in question.
- (no sign) we cannot responsibly attach this reference, but do not doubt it.
- ? (question mark) there is some doubt in attaching this reference to the current taxon.
- *v vidimus*, we have checked the deposited specimens. Can be accompanied by the above tokens:
- $v^*$  we have seen the type specimen(s).
- v. we take responsibility for attaching the deposited specimens.
- $\nu$  we do not take responsibility for attaching the deposited specimens.
- *v?* the specimens cannot be certainly assigned to this taxon.
- (?) the year of publication is uncertain.
- *p* only part of the deposited specimens can be assigned to the current taxon.
  - *vp* the deposited specimens have been checked and only part of them belong to this taxon.

And by formatting the year surrounding or changing the font

- 1881 (italicised) this work does not add morphological information, only occurrence information.
- 1881 (upright) the work adds to our knowledge on this taxon.
- (1881) (parentheses surrounding the year) the date of this work is uncertain.

## Life Science Identifiers (LSID)

Life science identifiers<sup>2</sup> are unique keys to identify and locate information important to the various life sciences. Relevant to this document are the identifiers used to link nomenclatural acts in *ZooBank*, <sup>3</sup> the official registry of the International Commission on Zoological Nomenclature (ICZN). Naming new taxa in the recent literature requires registering the act in ZooBank to be 'officially' recognised.<sup>4</sup>

Many of the taxa included herein were named before ZooBank was yet a glint in anyone's eye, although they may well have been included in the printed equivalent *Zoological Record*. I've registered several new publications and acts where these were not in ZooBank before, that

```
1 i.e. LSID
```

```
2 https://en.wikipedia.org/wiki/LSID
3 http://zoobank.org
4 https://www.iczn.org/the-code/
the-international-code-of-zoological-nomenclat
the-code-online/(Article 8.5.3);https:
//en.wikipedia.org/wiki/ZooBank
```

Introduction 2

may be used henceforth. At the moment, these include only the original naming of species, not new combinations of specific and generic names.

#### Links in this document

The LTEX document from which this PDF is compiled includes the *hyperref* package to provide links within the document<sup>5</sup> and to other references on the web.<sup>6</sup> These have different colours, as follows:

5 e.g. citations and sections 6 e.g. LSIDS and DOIS

*Citation* links from the year of a citation to its reference in the bibliography.

 $\it URL$  often web links, particularly to websites, DOI links, LSID with the address fully written.

link to a ZooBank LSID for an act.

# List of Species

**ICHTHYOSAUROMORPHA** Grippia longirostris Platypterygius americanus Guizhouichthyosaurus tangae Platypterygius australis HUPEHSUCHIA Guizhouichthyosaurus wolonggangense Platypterygius hauthali 10 Eohupehsuchus brevicollis Gulosaurus helmi Platypterygius ochevi Eretmorhipis carrolldongi Hauffiopteryx altera Platypterygius platydactylus Hupehsuchus nanchangensis Hauffiopteryx typicus 8 Protoichthyosaurus applebyi 10 Nanchangosaurus suni Himalayasaurus tibetensis 8 Protoichthyosaurus prostaxalis Parahupehsuchus longus Qianichthyosaurus xingyiensis Hudsonelpidia brevirostris 8 Ichthyosaurus acutirostris Qianichthyosaurus zhoui **ICHTHYOSAURIFORMES** Ichthvosaurus anningae Quasianosteosaurus vikinghoegdai Acamptonectes densus Ichthyosaurus breviceps Sclerocormus parviceps Acuetzpalin carranzai Ichthyosaurus communis 8 Shastasaurus alexandrae Aegirosaurus leptospondylus Ichthyosaurus conybeari Shastasaurus liangae Arthropterygius chrisorum Ichthyosaurus larkini Shastasaurus pacificus Arthropterygius hoybergeti Shastasaurus sikkaniensis Ichthyosaurus somersetensis Arthropterygius lundi Isfjordosaurus minor Shonisaurus popularis Arthropterygius thalassonotus Iabalisaurus metzli Simbirskiasaurus biriukovi 8  $Arthrop terygius\ volgens is$ Kyhytysuka sachicarum Sisteronia seeleyi Athabascasaurus bitumineus Leninia stellans Stenopterygius aaleniensis Auroroborealia incognita Leptonectes moorei Stenopterygius quadriscissus Barracudasauroides panxianensis Leptonectes solei Stenopterygius triscissus Besanosaurus leptorhynchus Leptonectes tenuirostris Stenopterygius uniter Brachypterygius alekseevi Macgowania janiceps Suevoleviathan disinteger Brachypterygius extremus Maiaspondylus lindoei Suevoleviathan integer  $Brachypterygius\ pseudoscythica$ Malawania anachronus Sveltonectes insolitus Californosaurus perrini Mixosaurus cornalianus Temnodontosaurus azerguensis Callawayia neoscapularis Mixosaurus kuhnschneyderi Temnodontosaurus crassimanus Cartorhynchus lenticarpus Mixosaurus xindianensis Temnodontosaurus eurycephalus  $Catuto saurus\ gas pariniae$ Mollesaurus pariallus Temnodontosaurus nuertingensis Caypullisaurus bonapartei Muiscasaurus catheti Temnodontosaurus platyodon Cetarthrosaurus walkeri Nannopterygius enthekiodon Temnodontosaurus trigonodon Chacaicosaurus cavi Nannopterygius saveljeviensis Thaisaurus chonglakmanii Chaohusaurus brevifemoralis Thalassodraco etchesi Nannoptervgius vasykovi Chaohusaurus chaoxianensis Ophthalmosaurus icenicus Thalattoarchon saurophagis Chaohusaurus geishanensis Ophthalmosaurus natans Tholodus schmidi Chaohusaurus zhangjiawanensis Parrassaurus yacahuitztli Toretocnemus californicus Contectopalatus atavus Parvinatator wapitiensis Toretocnemus zitteli Cymbospondylus buchseri Pervushovisaurus bannovkensis Undorosaurus gorodischensis Cymbospondylus nichollsi Pervushovisaurus campylodon Undorosaurus kielanae Cymbospondylus petrinus Pessopteryx nisseri Undorosaurus nessovi Cymbospondylus piscosus? Phalarodon callawayi Undorosaurus trautscholdi  $Cymbos pondylus\ young or um$ Phalarodon fraasi Utatsusaurus hataii 11 10 Dearcmhara shawcrossi Phalarodon major Wahlisaurus massarae Eurhinosaurus longirostris Phantomosaurus neubigi Wimanius odontonalatus 10 Excalibosaurus costini Platypterygius hercynicus Xinminosaurus catactes Gengasaurus nicosiai

#### ICHTHYOSAUROMORPHA Motani et al., 2015a

#### HUPEHSUCHIA Carroll & Zhi-Ming, 1991

#### Eohupehsuchus brevicollis Chen et al., 2014a

URN:LSID:ZOOBANK.ORG:ACT:94F905DD-8995-4477-841A-85DEDA8C8287

v \* 2014a Eohupehsuchus brevicollis Chen et al., 2014a

Chen et al. p 4 [Jialingjiang Formation (upper Spathian, Lower Triassic, Triassic); Yangping, Yuan'an County, Hubei Province, China.]

#### Eretmorhipis carrolldongi Chen et al., 2015

URN:LSID:ZOOBANK.ORG:ACT:317DA1DF-4381-43F5-90CE-ADFD680F7178

1991 Hupehsuchia n. gen. n. sp. Carroll & Zhi-Ming p 143 [Jialingjiang Formation (upper Spathian, Lower Triassic,

Triassic); Tuling, Baihechuan, Xunjiang District, Nanzhang County, Hubei Province,

China.]

v \* 2015 Eretmorhipis carrolldongi Chen et al., 2015 C

LSID

Chen et al. p 4 [Jialingjiang Formation (upper Spathian, Lower Triassic, Triassic); Yingzhishang, Yuan'an County, Hubei Province, China.] URN:LSID:ZOOBANK.ORG:PUB:132627FE-9142-4EE2-BACB-08CAFC65C3E2

#### Hupehsuchus nanchangensis Young & Dong, 1972

URN:LSID:ZOOBANK.ORG:ACT:416BF673-273A-4F3D-99B3-F369DBEC6CEA

v \* 1972 Hupehsuchus nanchangensis Young & Dong,

Young & Dong p 28 [Jialingjiang Formation (upper Spathian, Lower Triassic, Triassic).] URN:LSID:ZOOBANK.ORG:PUB:D2CAD534-D3B0-4B2B-871F-7011E4B1EE74

## Nanchangosaurus suni Wang, 1959

\* 1959 Nanchangosaurus suni Wang, 1959 LSID

Wang [JialingJiang Formation (upper Spathian, Lower Triassic, Triassic).] URN:LSID:ZOOBANK.ORG:PUB:C31DBAA9-EDA9-4D29-92DD-BFC80461F0F4

2014c Nanchangosaurus suni Wang, 1959 Chen et al. p 3 [Jialing Jiang Formation (upper Spathian, Lower Triassic, Triassic);

Yuan'an County, Hubei Province, China.]

#### Parahupehsuchus longus Chen et al., 2014b

URN:LSID:ZOOBANK.ORG:ACT:0B2F1D4D-0435-496F-B1C0-6913F265240F

v \* 2014b Parahupehsuchus longus Chen et al., 2014b

Chen  $\it et al. p$  3 [JialingJiang Formation (upper Spathian, Lower Triassic, Triassic); Yuan'an County, Hubei Province, China.] <code>URN:LSID:ZOOBANK.ORG:PUB:0F2EED52-F0A2-4125-B96A-8E39E9854DBE</code>

## ICHTHYOSAURIFORMES Motani et al., 2015a

#### Acamptonectes densus Fischer et al., 2012

URN:LSID:ZOOBANK.ORG:ACT:AAB4BA7E-F53D-4962-8A9C-3240DFE2C4D8

v \* 2012 Acamptonectes densus Fischer et al., 2012

Fischer *et al.* p 3 [Speeton Clay Formation, *Simbiskites concinnus/staffi* ammonite biozones (basal-upper Hauterivian, Lower Cretaceous, Cretaceous); Speeton, Yorkshire, U.K.] URN:LSID:ZOOBANK.ORG:PUB:66B3821A-1025-48DC-9C5F-7E6277FFD975 Fischer *et al.* p 3 [*Simbiskites concinnus/staffi* ammonite biozones (basal-upper Hauterivian, Lower Cretaceous, Cretaceous); Cremlingen, Lower Saxony, Germany.]

2012 Acamptonectes densus Fischer et al., 2012

URN:LSID:ZOOBANK.ORG:PUB:66B3821A-1025-48DC-9C5F-7E6277FFD975

#### Acuetzpalin carranzai Barrientos-Lara et al., 2020

URN:LSID:ZOOBANK.ORG:ACT:90130A25-6901-4DA6-84B8-D0680DF9BCAB

\* 2020 Acuetzpalin carranzai Barrientos-Lara et al., 2020 LSID

Barrientos-Lara *et al.* p 3 [La Casita Formation (Kimmeridgian, Upper Jurassic, Jurassic); Cerro de Palotes, near of Cuencamé, Durango state, Northeast Mexico.] URN:LSID:ZOOBANK.ORG;PUB:2287DBB3-3E85-409D-9D97-A946DE865FCB

## Aegirosaurus leptospondylus (Wagner, 1853)

\* 1853 Ichthyosaurus leptospondylus Wagner, 1853

Wagner [Solnhofen Formation (Lower Tithonian, Upper Jurassic, Jurassic); Germany.]

2000 Aegirosaurus leptospondylus (Wagner, 1853)

Bardet & Fernández p 504 [Malm  $\zeta$  2b, Solnhofen Formation (early Lower Tithonian, Upper Jurassic, Jurassic); Borscheim, Schrandel quarry district; Bavaria, Germany.]

## Arthropterygius chrisorum (Russell, 1993)

*	1993	Ophthalmosaurus chrisorum Russell, 1993	Russell p 198 [Ringnes Formation (Oxfordian–Kimmeridgian, Upper Jurassic, Jurassic); Cape Grassy, Melville Island, Canada (UTM WGS84 12X 433220 8453461 = $76^{\circ}$ 9' 4" N 113 $^{\circ}$ 30' W).]
?	2017	Keilhauia nui Delsett et al., 2017	Delsett <i>et al.</i> p 7 [Slottsmøya Member, Agardfjellet Formation (early Berriasian, Lower Cretaceous, Cretaceous); Janusfjellet, Spitsbergen, Svalbard (UTM WGS84 33X 0518847 8696044 = 78.3363734°N 15.8351277°E).] <i>fide</i> Zverkov & Prilepskaya (2019)
р		Palvennia hoybergeti Druckenmiller et al., 2012 Arthropterygius chrisorum (Russell, 1993)	Delsett <i>et al.</i> p 8 [UTM WGS84 33X 0519622 8695649 = 78.3327333°N 15.8692035°E] PMO 222.669 <i>fide</i> Zverkov & Prilepskaya (2019) Zverkov & Prilepskaya p 15

#### Arthropterygius hoybergeti (Druckenmiller et al., 2012)

URN:LSID:ZOOBANK.ORG:ACT:03BA5E23-17B5-4AB1-B98A-681B9968A3F9

*	2012	Palvennia hoybergeti Druckenmiller et al., 2012 LSID	Druckenmiller <i>et al.</i> p 326 [Slottsmøya Member, Agardfjellet Formation (Middle Volgian, Upper Jurassic, Jurassic); Spitsbergen, Svalbard (UTM WGS84 33X 0518775 8696150 = 78.3373322°N 15.8320045°E).] URN:LSID:ZOOBANK.ORG:PUB:8791DF9D-E15B-4470-A02A-F05ECC3BB7D6
p	2018	Palvennia hoybergeti Druckenmiller et al., 2012	Delsett et al. p 8 [UTM WGS84 33X 0519622 8695649 = 78.3327333°N 15.8692035°E]
	2019	Arthropterygius hoybergeti (Druckenmiller et al., 2012)	Zverkov & Prilepskaya p 31

## Arthropterygius lundi (Roberts et al., 2014)

URN:LSID:ZOOBANK.ORG:ACT:71E65B35-7215-44AA-BCE7-E9A3B265E04F

*	2014 Janusaurus lundi Roberts et al., 2014 LSID	Roberts <i>et al.</i> p 4 [Slottsmøya Member, Agardfjellet Formation (middle Volgian, Upper Jurassic, Jurassic); Janusfjellet, Spitsbergen, Svalbard (UTM WGS84 33X 518821 8696195 = 78° 20.264' N 15° 50.044' E).] URN:LSID:ZOOBANK.ORG:PUB:FF4834F1-AEED-4B08-8E74-7125801C1B3E <i>fide</i> Zverkov & Prilepskaya (2019)
	2016 Janusaurus lundi Roberts et al., 2014	Delsett et al.
	2017 Janusaurus lundi Roberts et al., 2014	Delsett et al.
	2019 Arthropterygius lundi (Roberts et al., 2014)	Zverkov & Prilepskaya p 40

#### Arthropterygius thalassonotus Campos et al., 2020

URN:LSID:ZOOBANK.ORG:ACT:3F09C714-961C-433C-B056-DFD3F8E3B5CD

2020 LSID

2020 Arthropterygius thalassonotus Campos et al., Campos et al. p 184 [Vaca Muerta Formation (late Tithonian, Upper Jurassic, Jurassic); Yesera del Tromen-Pampa Tril area, north-western Neuquén Province, Argentina.] urn:LSID:ZOOBANK.ORG:PUB:A668AA96-CE4F-442E-AD3E-B757AD580CFC

## Arthropterygius volgensis (Kasansky1903TOEPIKU)

2019 Arthropterygius volgensis (Kasansky1903TOEPIKU) Zverkov & Prilepskaya p 44 [Dorsoplanites panderi Ammonite Biozone (middle Volgian, Upper Jurassic, Jurassic); mouth of the Berezoviy Dol Ravine near Novaya Racheika Village, Syzran District, Samara Region, Russian.]

#### Athabascasaurus bitumineus Druckenmiller & Maxwell, 2010

URN:LSID:ZOOBANK.ORG:ACT:1CE8B3C1-8771-443A-8831-00025FB84CA6

& Maxwell, 2010 LSID

 $v \ ^* \ 2010 \ \textit{Athabascasaurus bitumineus} \ Druckenmiller \ \ \textit{Druckenmiller} \ \& \ \textit{Maxwell p 1039} \ [\textit{Wabiskaw Member, Clearwater Formation}]$ (lowermost Albian, Lower Cretaceous, Cretaceous); 35 km north of Fort McMurray, Alberta, Canada (UTM WGS84 12V 459464 6317120 = 56° 59′ 45″ N 111° 40′ 02″ W),] URN:LSID:ZOOBANK.ORG:PUB:2540811F-95E5-45BB-9B32-8E0416F61681

#### Auroroborealia incognita Zverkov et al., 2021

URN:LSID:ZOOBANK.ORG:ACT:5EFAB647-9971-4361-925D-A64B665521E9

2021 Auroroborealia incognita Zverkov et al., 2021 Zverkov et al. p 6 [Pinacoceras verchojanicum Ammonoid Biozone (lower Norian, Upper Triassic, Triassic); Kotelny Island, New Siberian Islands, Russia.]

## Barracudasauroides panxianensis (Jiang et al., 2006)

URN:LSID:ZOOBANK.ORG:ACT:05C7C635-6E53-4070-8856-047553A6B0BF

2006 Mixosaurus panxianensis Jiang et al., 2006 Jiang et al. p 62 [Upper Member, Guanling Formation, Nicoraella germanicus Conodont Biozone (Pelsonian, Anisian, Middle Triassic, Triassic); Yangjuan Village, Xinmin District, Panxian County, Guizhou Province, China.] URN:LSID:ZOOBANK.ORG:PUB:A3ED6813-7AA8-47CA-8197-04CA562417DF

2010 Barracudasauroides panxianensis (Maisch,

Maisch p 161

#### Besanosaurus leptorhynchus Dal Sasso & Pinna, 1996

URN:LSID:ZOOBANK.ORG:ACT:47C32E1B-18FE-40CF-B98E-E9A537601E43

*	1996	Besanosaurus leptorhynchus Dal Sasso & Pinna, 1996 LSID	Dal Sasso & Pinna p 4 [Besano Formation, <i>Nevadites secedensis</i> Ammonite Biozone (Ilyrian, Anisian, Middle Triassic, Triassic); Sasso Caldo, Italy.]
			URN:LSID:ZOOBANK.ORG:PUB:EEA0F11C-D7BF-41BE-856E-DC2F3599273A
	1997	Mikadocephalus gracilirostris Maisch &	Maisch & Matzke p 268 [Besano Formation, Reitziites reitzi-Nevadites secedensis am-
		Matzke, 1997	monoid biozones (Ilyrian, Anisian, Middle Triassic, Triassic); Switzerland.]

Matzke, 1997 monoid biozones (Ilyrian, Anisian, Middle Triassic, Triassic); Switzerland.]

2021 Besanosaurus leptorhynchus Dal Sasso &
Pinna, 1996 pinna, 1996 (Ilyrian, Anisian, Middle Triassic, Triassic); Sasso Caldo, Italy.]

2021 Besanosaurus leptorhynchus Dal Sasso & Bindellini et al. p 20 [Besano Formation, Nevadites secedensis Ammonoid Biozone Pinna, 1996 (Ilyrian, Anisian, Middle Triassic, Triassic); Val Stelle, Tre Fontane, Switzerland.]

## Brachypterygius alekseevi (Arkhangelsky, 2001)

*	2001 Otschevia alekseevi Arkhangelsky, 2001	Arkhangelsky p 629 [Dorsoplanites panderi Ammonite Biozone (Volgian, Upper Juras-
		cic Turoccic): Volco Pivor 18 km north of Ulyanovek, Ulyanovek District Ulyanovek

sic, Jurassic); Volga River, 18 km north of Ulyanovsk, Ulyanovsk District, Ulyanovsk Region, Russian.]

Region, Kussiar 010 Brachypterygius alekseevi (Arkhangelsky, Maisch p 167

2001)

2015 Grendelius alekseevi (Zverkov et al., 2015) Zverkov et al. p 562

#### Brachypterygius extremus (Boulenger, 1904)

URN:LSID:ZOOBANK.ORG:ACT:5B04A1AF-9081-417D-9BFC-DC3AFA6DAAE3

v \* 1904 Ichthyosaurus extremus Boulenger, 1904 LSID Boulenger p 425 [Kimmeridge Clay Formation (Kimmeridgian-Tithonian, Upper Jurassic, Jurassic); Smallmouth Sands, Weymouth, Dorset, U.K.]

URN:LSID:ZOOBANK.ORG:PUB:98E5CD50-9FAF-458D-9D0A-9464EF76F429

v 1922 Brachypterygius extremus (Boulenger, 1904)

v \* 1976 Grendelius mordax McGowan, 1976 McGowan p 671 [Kimmeridge Clay Formation of the control of the control

von Huene p 97 URN:LSID:ZOOBANK.ORG:PUB:2E316B82-8A25-43AE-A1C5-3785124EA6AE McGowan p 671 [Kimmeridge Clay Formation, *Aulacostephanus autissiodorensis* Ammonite Biozone (middle Kimmeridgian, Upper Jurassic, Jurassic); Stowbridge, Norfolk, U.K. (UTM WGS84 31U 321960 5835045 = 52.6361361°N 0.368878°E).]

## Brachypterygius pseudoscythica (Efimov, 1998)

\* 1998 Otschevia pseudoscythica Efimov, 1998 Efimov p 83 [Ilowaiskya pseudoscythica Ammonite Biozone (Volgian, Upper Jurassic,

Jurassic); Volga River, Ulyanovsk District, Ulyanovsk Region, Russia.]
2000 Brachypterygius psudoscythius (Efimov, 1998) Maisch & Matzke p 79

[sic.]

2015 Grendelius pseudoscythicus (Efimov, 1998) [sic.]

[316.]

# Zverkov *et al.* p 561

## Californosaurus perrini (Merriam, 1902)

\* 1902 Shastasaurus perrini Merriam, 1902 Merriam p 89 [Hosselkus Limestone Formation; Shasta County, California, U.S.A.]

1905 Delphinosaurus perrini (Merriam, 1902) Merriam p 24

1934 Californosaurus perrini (Merriam, 1902) Kuhn p 27 [non Delphinosaurus von Eichwald, 1853]

#### Callawayia neoscapularis (McGowan, 1994)

 $* \quad 1994 \quad \textit{Shastasaurus neoscapularis} \; \texttt{McGowan}, \\ 1994 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1994 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1994 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1994 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1995 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{Conodont Biozone}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{McGowan}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{McGowan}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{McGowan}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{McGowan}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{McGowan}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{Pardonet Formation}, \textit{Epigondolella triangularis} \; \texttt{McGowan}, \\ 1996 \quad \quad \texttt{McGowan} \; p \; 170 \; [\texttt{McGowan}, \texttt{McGowan}, \texttt{McGowan}$ 

(Norian, Upper Triassic, Triassic); Peace Reach, Williston Lake, British Columbia,

Canada.]

2000 Callawayia neoscapularis (McGowan, 1994) Maisch & Matzke p 69 New combination takes priority over Metashastasaurus (Nich-

olls & Manabe, 2001, p. 1001).

2001 Metashastasaurus neoscapularis (McGowan, Nicholls & Manabe p 985 [Pardonet Formation (Norian, Upper Triassic, Triassic);

1994) Chicken Creek, British Columbia, Canada.]

## Cartorhynchus lenticarpus Motani et al., 2015a

URN:LSID:ZOOBANK.ORG:ACT:FCCC9BB7-FD52-42F4-B2EC-B0B7E2A1CA32

\* 2015a Cartorhynchus lenticarpus Motani et al., 2015a Motani et al. p 485 [Upper Member, Nanlinghu Formation, Subcolumbites Ammonite Biozone (Olenekian, Lower Triassic, Triassic); Majishan Quarry, Chaohu
City, Hefei, China (UTM WGS84 50R 577953 3499041 = 31° 37′ 26″ N 117° 49′ 19″ E).]

URN:LSID:ZOOBANK.ORG:PUB:9CFFEE63-2B8A-4C01-B9C7-CD3C53D684F5

#### Catutosaurus gaspariniae Fernández et al., 2021

URN:LSID:ZOOBANK.ORG:ACT:BC3E93E7-C574-4B50-9315-2CDAD067C721

1988 Ophthalmosaurus monocharactus Gasparini p 3 [Vaca Muerta Formation.]
Appleby1956PZSL

2000 Aegirosaurus sp. Bardet & Fernández, 2000
2021 Catutosaurus gaspariniae Fernández et al.,
2021 LSID

Maisch & Matzke p 87

Fernández et al. p 2 [Los Catutos Member, Vaca Muerta Formation, Aulasphinctes proximus-Windhauseniceras internispinosum ammonoid biozones (upper middle-lower upper Tithonian, Upper Jurassic, Jurassic); El Ministerio
Quarry, Los Catutos, Zapala Department, Neuquén Province, Argentina.]
URN:LSID:ZOOBANK.ORG:PUB:FDB6C301-BAE5-4212-9310-BE09E24605F9 SUPPLEMENTAL
DATA—SUPPLEMENTAL MATERIALS ARE AVAILABLE FOR THIS ARTICLE FOR FREE AT W

#### Caypullisaurus bonapartei Fernández, 1997

URN:LSID:ZOOBANK.ORG:ACT:046EED7E-C624-465F-B0D4-1BB782CCD97D

\* 1997 Caypullisaurus bonapartei Fernández, 1997

Fernández p 480 [Vaca Muerta Formation, *Virgatosphinctes mendozanus* Ammonite Biozone (late Tithonian, Upper Jurassic, Jurassic); Cerro Lotena, Neuquén Province, northwest patagonia, Argentina (UTM WGS84 19H 442358 5661434 = 39° 11′ 40″ N 69° 40′ 03″ \$).] URN:LSID:ZOOBANK.ORG:PUB:1A5DDCD0-1713-410A-AE1B-F02EA1F1DF77

#### Cetarthrosaurus walkeri (Seeley, 1873)

\* 1869 Ichthyosaurus walkeri Seeley, 1869 Seeley p 65 [Gault Formation (late Albian, Lower Cretaceous, Cretaceous).] Reworked into Cambridge Greensand Member (Lower Chalk Formation; early Cenomanian). Described from a cast.

1873 Cetarthrosaurus walkeri (Seeley, 1869)
2014a Cetarthrosaurus walkeri (Seeley, 1869)
Fischer et al. p 17

### Chacaicosaurus cayi Fernández, 1994

\* 1994 Chacaicosaurus cayi Fernández, 1994 Fernández p 293 [Les Molles Formation (early Bajocian, Middle Jurassic, Jurassic); Chacaico Sur, Patagonia, Argentina.]
2007 Stenopterygius cayi (Fernández, 1994) Fernández p 277

## Chaohusaurus brevifemoralis Huang et al., 2019

URN:LSID:ZOOBANK.ORG:ACT:B0085E53-C6E4-4C2E-96FF-6D485D3585BA

p 1998a Chaohusaurus chaoxianensis (Chen, 1985)
 p 1998b Chaohusaurus geishanensis Young & Dong, 1972
 p 2015b Chaohusaurus chaoxianensis (Chen, 1985)
 p 2017 Chaohusaurus chaoxianensis (Chen, 1985)
 x 2019 Chaohusaurus brevifemoralis Huang et al., Huang et al. p 7 [Upper Page 1985]

ng et al., Huang et al. p 7 [Upper Member, Nanlinghu Formation, Subcolumbites Ammonoid Biozone (Spathian, Olenekian, Lower Triassic, Triassic); Majiashan, Anhui Province, China.] URN:LSID:ZOOBANK.ORG:PUB:3FA09089-C940-4499-ABBC-B48F0F70F38E

## Chaohusaurus chaoxianensis (Chen, 1985)

2019 LSID

1985 Anhuisaurus chaoxianensis Chen, 1985 Chen p 140 [Upper Member, Nanlinghu Formation (Spathian, Olenekian, Lower Triassic, Triassic); Majiashan, Anhui Province, China.] 1985 Anhuisaurus faciles Chen, 1985 Chen p 142 [Upper Member, Nanlinghu Formation (Spathian, Olenekian, Lower Triassic, Triassic); Majiashan, Anhui Province, China.] Chensaurus chaoxianensis (Chen, 1985) Mazin et al. p 1207 1991 Chensaurus faciles (Chen, 1985) Mazin et al. p 1207 1998a Chaohusaurus chaoxianensis (Chen. 1985) Motani & You 1998b Chaohusaurus geishanensis Young & Dong, Motani & You p 533 2015b Chaohusaurus chaoxianensis (Chen, 1985) Motani et al. p e892011-3

#### Chaohusaurus geishanensis Young & Dong, 1972

\* 1972 Chaohusaurus geishanensis Young & Dong, Young & Dong p 11 [Qinglong Formation (Spathian, Lower Triassic, Triassic); Chao 1972 County, Anhui Province, China.]

#### Chaohusaurus zhangjiawanensis Chen et al., 2013

v \* 2013 Chaohusaurus zhangjiawanensis Chen et al., Chen et al. p 673 [Third Member, Jialingjiang Formation, Neospathodus homeri–N. triangularis Conodont Biozone (upper Spathian, Lower Triassic, Triassic); Zhangjiawan Village, Yangping Town, Yuan'an County, Hubei Province, China.]

## Contectopalatus atavus (Quenstedt, 1852)

\* 1852 Ichthyosaurus atavus Quenstedt, 1852 Quenstedt p 129 [Wellenkalk Formation (Anisian, Middle Triassic, Triassic);
Althengstett, Baden-Württenbug, Germany.]

```
1891 Mixosaurus atavus atavus (Quenstedt, 1852)
                                                Fraas p 38 fide McGowan & Motani (2003, p. 67)
        [as Mixossaurus atavus var. minor]
   1916 Mixosaurus atavus (Quenstedt, 1852)
                                                von Huene p 3
   1998b Contectopalatus atavus (Quenstedt, 1852)
                                                Maisch & Matzke p 115
   2003 Mixosaurus atavus (Quenstedt, 1852)
                                                McGowan & Motani p 67
Cymbospondylus buchseri Sander, 1989
Cymbospondylus nichollsi Fröbisch et al., 2006
Cymbospondylus petrinus Leidy, 1868
Cymbospondylus piscosus? Leidy, 1868
Cymbospondylus youngorum Sander et al., 2021
   2021 Cymbospondylus youngorum Sander et al.,
                                                Sander et al. p 1 [Fossil Hill Member, Favret Formation, Nevadisculites taylori Am-
                                                monoid Biozone (Anisian, Middle Triassic, Triassic); Favret Canyon, Augusta Moun-
                                                tains, Pershing County, Nevada, USA.]
Dearcmhara shawcrossi Brusatte et al., 2015
Eurhinosaurus longirostris (Mantell, 1851)
Excalibosaurus costini McGowan, 1986
Gengasaurus nicosiai Paparella et al., 2016
Grippia longirostris Wiman, 1929
Guizhouichthyosaurus tangae Yin et al., 2000
Guizhouichthyosaurus wolonggangense (Chen et al., 2007)
Gulosaurus helmi Cuthbertson et al., 2013
Hauffiopteryx altera Maxwell & Cortés, 2020
   URN:LSID:ZOOBANK.ORG:ACT:A567A292-2A58-495A-839F-FF8382B49479
   2005 Eurhinosaurus longirostris (Mantell, 1851)
   2020 Hauffiopterx altera Maxwell & Cortés, 2020
                                                Maxwell & Cortés p 11 [Lias & II,4/5, Posidonia Shale Formation, Harpoceras serpent-
                                                inum Ammonoid Biozone, Harpoceras exaratum Ammonoid Subbiozone (Toarcian,
                                                Lower Jurassic, Jurassic): Dotternhausen-Dormettingen, Bade-Württemberg, Ger-
                                                many.] URN:LSID:ZOOBANK.ORG:PUB:041F166A-28FC-4ED6-AD7C-DF64EF4EF1A7
Hauffiopteryx typicus Maisch, 2008
   2020 Hauffiopterx typicus Maisch, 2008
                                                Maxwell & Cortés p 3 [Lias & II,4, Posidonia Shale Formation, Harpoceras serpentinum
                                                Ammonoid Biozone, Harpoceras exaratum Ammonoid Subbiozone (Toarcian, Lower
                                                Jurassic, Jurassic); Dotternhausen-Dormettingen, Bade-Württemberg, Germany.]
Himalayasaurus tibetensis Young & Dong, 1972
   1972 Himalayasaurus tibetensis Young & Dong,
                                                Young & Dong p 7 [Langjiexue Group (Norian, Middle Triassic, Triassic); Tulong
                                                Area, Xizang, Tibet, China.] URN:LSID:ZOOBANK.ORG:PUB:D2CAD534-D3B0-4B2B-871F-
        1972 LSID
                                                7011E4B1EE74
Hudsonelpidia brevirostris McGowan, 1995
Ichthyosaurus acutirostris Owen, 1840
Ichthyosaurus anningae Lomax & Massare, 2015
Ichthyosaurus breviceps Owen, 1881
Ichthyosaurus communis Conybeare, 1822
Ichthyosaurus conybeari Lydekker, 1888
Ichthyosaurus larkini Lomax & Massare, 2017
Ichthyosaurus somersetensis Lomax & Massare, 2017
Isfjordosaurus minor (Wiman, 1910)
```

Jabalisaurus metzli Barrientos-Lara & Alvarado-Ortega, 2021b urn:lsid:zoobank.org:act:eaebe989-a483-478e-85b0-32995fdc8057

2010 Ophthalmosaurus cf. icenicus Seeley, 1874
2014 Ophthalmosaurus cf. icenicus Seeley, 1874
2021b Jabalisaurus metzli Barrientos-Lara &

Alvarado-Ortega, 2021b LSID

Buchy p 149 [coquina layer, La Casita Formation (upper Kimmeridgian, Upper Jurassic, Jurassic); Sierra El Jabalí, near Gómez Farías, Saltillo, Caohuila, Mexico.]
Frey & Stinnesbeck [Sierra El Jabalí, near Gómez Farías, Saltillo, Caohuila, Mexico.]
Barrientos-Lara & Alvarado-Ortega p 4 [coquina layer, La Casita Formation (upper Kimmeridgian, Upper Jurassic, Jurassic); Sierra El Jabalí, near Gómez Farías, Saltillo, Caohuila, Mexico.]

#### Kyhytysuka sachicarum (Páramo-Fonseca, 1997)

1997 Platypterygius sachicarum Páramo-Fonseca, Páramo-Fonseca p 2 [Arcillolitas Abigarrada Member, Paja Formation (Barremian-Aptian, Lower Cretaceous, Cretaceous); Loma Pedro Luis, Villa de Leyva, Boyacá, Colombia.]

2021 Kyhytysuka sachicarum (Páramo-Fonseca,

1997)

Cortés et al. p 2 [Arcillolitas Abigarrada Member, Paja Formation (latest Barremian, Lower Cretaceous, Cretaceous); El Roble Locality, Villa de Leyva, Boaycá, Colombia.] URN:LSID:ZOOBANK.ORG:PUB:E3FD55AF-2AD1-46CA-A49C-1FB4B102AB2C

Leninia stellans Fischer et al., 2014b

Leptonectes moorei McGowan & Milner, 1999

Leptonectes solei (McGowan, 1993)

Leptonectes tenuirostris (Conybeare, 1822)

Macgowania janiceps (McGowan, 1996)

Maiaspondylus lindoei Maxwell & Caldwell, 2006

Malawania anachronus Fischer et al., 2013

Mixosaurus cornalianus (Bassani, 1886)

Mixosaurus kuhnschneyderi (Brinkmann, 1998)

Mixosaurus xindianensis Chen & Cheng, 2010

Mollesaurus pariallus Fernández, 1999

Muiscasaurus catheti Maxwell et al., 2016

2016 Muiscasaurus catheti Maxwell et al., 2016

Maxwell et al. p 61 [Arcillolitas abigarradas Member, Paja Formation (Barremian-Aptian, Lower Cretaceous, Cretaceous); Vereda Llanitos, Sachica, Boyaca, Colombia (UTM WGS84 18N 662860 616018 = 05° 34.278' N 73° 31.781' W).]

#### Nannopterygius enthekiodon (Hulke, 1871)

URN:LSID:ZOOBANK.ORG:ACT:8467F95F-AC53-4EA7-9612-230E9222A6FC

v \* 1871 Ichthyosaurus enthekiodon Hulke, 1871 LSID

Hulke p 441 [Kimmeridge Clay Formation (Kimmeridgian-Tithonian, Upper Jurassic, Jurassic); Kimmeridge Bay, Dorset, U.K.] URN:LSID:ZOOBANK.ORG:PUB:4F0E90D0-27FF-409A-9CD5-976F182B8B4C

1922 Nannopterygius enthekiodon (Hulke, 1871)

von Huene p 98 urn:LSID:ZOOBANK.ORG:PUB:2E316B82-8A25-43AE-A1C5-3785124EA6AE

#### Nannopterygius saveljeviensis (Arkhangelsky, 1997)

1997 Paraophthalmosaurus savejeviensis Arkhangelsky, 1997

Arkhangelsky p 88

1999a Yasykovia kabanovi Efimov, 1999a

Efimov p 98

 ${\it 2020 Nannopterygius savejeviensis} \ (Arkhangelsky, Zverkov \& Jacobs p \ 246 \ [Volgian, Upper Jurassic, Jurass$ 

#### Nannopterygius yasykovi (Efimov, 1999a)

1999a Yasykovia sumini Efimov, 1999a

Efimov p 98

### Ophthalmosaurus icenicus Seeley, 1874

URN:LSID:ZOOBANK.ORG:ACT:F598EAB9-08BF-44CF-BBF3-BB940BD24DBE

v \* 1874 Ophthalmosaurus icenicus Seeley, 1874 LSID

Seeley p 707 [Peterborough Member, Oxford Clay Formation (Callovian, Middle Jurassic, Jurassic); Peterborough, Cambridgeshire.] URN:LSID:ZOOBANK.ORG:PUB:4C83C9B2-665D-4AD7-8AF8-D365E5491831

## Ophthalmosaurus natans (Marsh, 1879)

Parrassaurus yacahuitztli Barrientos-Lara & Alvarado-Ortega, 2021a

URN:LSID:ZOOBANK.ORG:ACT:EACD70CD-6B63-4485-9C27-23EFDC64D165

2021a Parrassaurus yacahuitztli Barrientos-Lara & Alvarado-Ortega, 2021a LSID

Barrientos-Lara & Alvarado-Ortega p 2 [La Caja Formation (upper Tithonian, Upper Jurassic, Jurassic); Rancho el Sombrero, Sierra de Parras, Saltillo Municipality, Coahuila, Mexico.] URN:LSID:ZOOBANK.ORG:PUB:3C6D6D2B-6F30-4DF3AEB4-FD2B-

9

Parvinatator wapitiensis Nicholls & Brinkman, 1995 Pervushovisaurus bannovkensis Arkhangelsky, 1998

Pervushovisaurus campylodon (Carter, 1846)

```
Ichthyosaurus campylodon Carter, 1846
                                              Carter p 60 [Upper Greensand Formation (Albian-Cenomanian, Lower-Upper Creta-
   1846
                                              ceous, Cretaceous); Cambridge, Cambridgeshire, U.K.]
   1922 Myopterygius campylodon (Carter, 1846)
                                              von Huene p 98 URN:LSID:ZOOBANK.ORG:PUB:2E316B82-8A25-43AE-A1C5-3785124EA6AE
        Platypterygius campylodon (Carter, 1846)
                                              McGowan p 17
   2016 Pervushovisaurus campylodon (Carter, 1846)
                                              Fischer p 8
Pessopteryx nisseri Wiman, 1910
   1910 Pessopteryx nisseri Wiman, 1910
                                              Wiman p 139 [Lower Saurian Niveau, Vikinghøgda Formation, Keyserlingites subro-
                                              bustus Ammonoid Biozone (Spathian, Lower Triassic, Triassic).]
Phalarodon callawayi Schmitz et al., 2004
Phalarodon fraasi Merriam, 1910
Phalarodon major von Huene, 1916
Phantomosaurus neubigi (Sander, 1997)
Platypterygius hercynicus Kuhn, 1946
Platypterygius americanus Nace, 1939
   1939 Myopterygius americanus Nace, 1939
                                              Nace p 674 [Mowry Shale Member, Graneros Formation; Crook County Wyoming,
                                              U.S.A.1
   1968 Myopterygius americanus Nace, 1939
                                              Romer p 27 [Mowry Shale Member, Graneros Formation; Osage, Wyoming, U.S.A.]
   1972 Platypterygius americanus (Nace, 1939)
                                              McGowan p 17
Platypterygius australis (M'Coy, 1867)
Platypterygius hauthali (von Huene, 1927)
Platypterygius ochevi Arkhangelsky et al., 2008
Platypterygius platydactylus (Broili, 1907)
   1922 Platypterygius platydactylus (Broili, 1907)
                                              von Huene p 99 URN:LSID:ZOOBANK.ORG:PUB:2E316B82-8A25-43AE-A1C5-3785124EA6AE
Protoichthyosaurus applebyi Lomax et al., 2017
Protoichthyosaurus prostaxalis Appleby, 1979
Qianichthyosaurus xingyiensis Yang et al., 2013
Qianichthyosaurus zhoui Li, 1999
Quasianosteosaurus vikinghoegdai Maisch & Matzke, 2003
Sclerocormus parviceps Jiang et al., 2016
Shastasaurus alexandrae Merriam, 1902
Shastasaurus liangae (Yin et al., 2000)
Shastasaurus pacificus Merriam, 1895
Shastasaurus sikkaniensis (Nicholls & Manabe, 2004)
Shonisaurus popularis Camp, 1976
Simbirskiasaurus birjukovi Otschev & Efimov, 1985
Sisteronia seeleyi Fischer et al., 2014a
Stenopterygius aaleniensis Maxwell et al., 2012
Stenopterygius quadriscissus (Quenstedt, 1858)
Stenopterygius triscissus (Quenstedt, 1858)
Stenopterygius uniter von Huene, 1931b
Suevoleviathan disinteger (von Huene, 1926)
Suevoleviathan integer (Bronn, 1844)
Sveltonectes insolitus Fischer et al., 2011
Temnodontosaurus azerguensis Martin et al., 2012
Temnodontosaurus crassimanus (Blake, 1876)
Temnodontosaurus eurycephalus McGowan, 1974
Temnodontosaurus nuertingensis (von Huene, 1931a)
Temnodontosaurus platyodon (Conybeare, 1822)
Temnodontosaurus trigonodon (von Theodori, 1843)
```

List of Species 10

Thaisaurus chonglakmanii Mazin et al., 1991

#### Thalassodraco etchesi Jacobs & Martill, 2020

URN:LSID:ZOOBANK.ORG:ACT:35626449-D5AC-4970-B76E-27A827126D23

v \* 2020 Thalassodraco etchesi Jacobs & Martill, 2020 Jacobs & Martill p 7 [White Stone Band, Kimmeridge Clay Formation, Pectinatites  $pectinatus \ Ammonite \ Biozone \ (early \ Tithonian, \ Upper \ Jurassic, \ Jurassic); \ Rope \ Lake$ Bay, Kimmeridge, Dorset U.K.] URN:LSID:ZOOBANK.ORG:PUB:C1D99FF1-D4FC-4526-8E28-1B8FA64E21C0 UK GR SY932775

Thalattoarchon saurophagis Fröbisch et al., 2013

Tholodus schmidi von Meyer, 1849

Toretocnemus californicus Merriam, 1903

Toretocnemus zitteli (Merriam, 1903)

Undorosaurus gorodischensis Efimov, 1999b

1999b Undorosaurus gorodischensis Efimov, 1999b

Efimov p 52 [Epivirgatites nikitini Ammonite Biozone (Volgian, Upper Jurassic, Jurassic); Undory, Volga Oblast, Russia.]

2012 Cryopterygius kristiansenae Druckenmiller et al., 2012 LSID

Druckenmiller et al. p 313 [Slottsmøya Member, Agardfjellet Formation (middle Vol-

gian, Upper Jurassic, Jurassic); Janusfjellet, Spitsbergen, Svalbard (UTM WGS84 33X 0518842 8696067 = 78.3365801°N 15.8349207°E).] URN:LSID:ZOOBANK.ORG:PUB:8791DF9D-

E15B-4470-A02A-F05ECC3BB7D6 fide Zverkov & Efimov (2019)

2019 Undorosaurus gorodischensis Efimov, 1999b

Zverkov & Efimov p 1189

## Undorosaurus kielanae (Tyborowski, 2016)

2016 Cryopterygius kielanae Tyborowski, 2016

Tyborowski p 793 [Sławno Limestone Member, Kcynia Formation (uppermost Lower Tithonian = Middle Volgian, Upper Jurassic, Jurassic); Owadów-Brzezinki Quarry, Sławno (UTM WGS84 34U 439831 5692022 = 51.3762583 N 20.1355167 E).]

Undorosaurus kielanae (Tyborowski, 2016)

Zverkov & Efimov p 1187

Undorosaurus nessovi Efimov, 1999b Undorosaurus trautscholdi Arkhangelsky & Zverkov, 2014 Utatsusaurus hataii Shikama et al., 1978 Wahlisaurus massarae Lomax, 2016

2016 Wahlisaurus massarae Lomax, 2016

Lomax p 388 [Barnstone Member?, Scunthorpe Mudstone Formation?, Pre-planorbis or Psiloceras planorbis beds (lowermost Hettangian, Lower Jurassic, Jurassic); Normanton Hills near Normanton on Soar, Nottinghamshire, U.K.]

Wimanius odontopalatus Maisch & Matzke, 1998a Xinminosaurus catactes Jiang et al., 2008

- APPLEBY, R.M. 1979. The affinities of Liassic and later ichthyosaurs. *Palaeontology*, **22**, 921–946.
- ARKHANGELSKY, M.S. 1997. On a new genus of ichthyosaurs from the Lower Volgian Substage of the Saratov, Volga Region. *Paleontologicheskii Zhurnal*, **1997**, 87–91.
- —— 1998. On the ichthyosaurian genus *Platy-pterygius*. *Paleontologicheskii Zhurnal*, **1998**, 65–69.
- —— 2001. On a new ichthyosaur of the Genus Otschevia from the Volgian Stage of the Volga Region near Ulyanovsk. Paleontological Journal, 35, 629-635.
- —— & ZVERKOV, N.G. 2014. On a new ichthyosaur of the genus *Undorosaurus*. *Proceedings of the Zoological Institute RAS*, 318, 187–196.
- ——, AVERIANOV, A.O., PERVUSHOV, E.M., RATNIKOV, V.Y. & ZOZYREV, N.Y. 2008. On ichthyosaur remains from the Cretaceous of the Voronezh Region. *Paleontological Journal*, **42**, 287–291. DOI: 10 . 1134 / S0031030108030106.
- BARDET, N. & FERNÁNDEZ, M.S. 2000. A new ichthyosaur from the Upper Jurassic lithographic limestones of Bavaria. *Journal of Paleontology*, **74**, 503–511. DOI: 10 . 1017 / S0022336000031760.
- BARRIENTOS-LARA, J.I. & ALVARADO-ORTEGA, J. 2021a. A new Tithonian ophthalmosaurid ichthyosaur from Coahuila in northeastern Mexico. Alcheringa: An Australasian Journal of Palaeontology, 1–14. DOI: 10.1080 / 03115518.2021.1922755.
- —— & —— 2021b. A new ophthalmosaurid (Ichthyosauria) from the Upper Kimmeridgian deposits of the La Casita Formation, near Gómez Farías, Coahuila, northern Mexico. *Journal of South American Earth Sciences*, 111, 103499.
  DOI: 10.1016/j.jsames.2021.103499.
- ——— & FERNÁNDEZ, M.S. 2020. Acuetzpalin carranzai gen et sp. nov. a new ophthalmosauridae (Ichthyosauria) from the Upper Jurassic of Durango, North Mexico. Journal of South American Earth Sciences, 102456. DOI: 10.1016/j.jsames.2019.102456.
- BASSANI, F. 1886. Sui fossili e sull'età degli schisti bituminosi Triasici di Besano in Lombardia. *Atti della Società Italiana di Scienza Naturali*, **29**, 1–58.
- BINDELLINI, G., WOLNIEWICZ, A.S., MIEDEMA, F., SCHEYER, T.M. & SASSO, C.D. 2021. Cranial anatomy of *Besanosaurus leptorhynchus* Dal Sasso & Pinna, 1996 (Reptilia: Ichthyosauria) from the Middle Triassic Besano Formation of Monte San Giorgio, Italy/Switzerland: taxonomic and palaeobiological implications. *PeerJ*, 9, e11179. DOI: 10.7717 / peerj. 11179.
- BLAKE, J.F. 1876. Order Ichthyopterygia. 253–254.

- BOULENGER, G.A. 1904. Exhibition of, and remarks upon, a paddle of a new species of ichthyosaur. *Proceedings of the Zoological Society of London*, **1904**, 424–426.
- BRINKMANN, W. 1998. Sangiorgiosaurus n. g. eine neue Mixosaurier-gattung (Mixosauridae, Ichthyosauria) mit Quetschzähnen aus der Grenzbitumenzone (Mitteltrias) des Monte San Giorgio (Schweiz, Kanton Tessin). Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 207, 125–144. DOI: 10.1127/njgpa/207/1998/125.
- BROILI, F. 1907. Ein neuer *Ichthyosaurus* aus der norddeutschen Kreide. *Palaeontographica*, **54**, 139–162.
- Bronn, H.G. 1844. Über Ichthyosauren in den Lias-Schiefern der Gegend von Boll in Württemberg. Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefakten-Kunde, 1844, 385–408.
- BRUSATTE, S.L., YOUNG, M.T., CHALLANDS, T.J., CLARK, N.D.L., FISCHER, V., FRASER, N.C., LISTON, J.J., MACFADYEN, C.C.J., ROSS, D.A., WALSH, S.A. & WILKINSON, M. 2015. Ichthyosaurs from the Jurassic of Skye, Scotland. Scottish Journal of Geology, **51**, 1–13. DOI: 10.1144/sjg2014–018.
- BUCHY, M.-C. 2010. First record of *Ophthalmo-saurus* (Reptilia: Ichthyosauria) from the Tithonian (Upper Jurassic) of Mexico. *Journal of Paleontology*, **84**, 149–155. DOI: 10.1666/08–122.1.
- Camp, C.L. 1976. Vorläufige Mitteilung über große Ichthyosaurier aus der oberen Trias von Nevada. Sitzungberichte der Österrichischen Akademie der Wissenschaften, **185**, 125–134.
- CAMPOS, L., FERNÁNDEZ, M.S. & HERRERA, Y. 2020.
  A new ichthyosaur from the late jurassic of north-west patagonia (argentina) and its significance for the evolution of the narial complex of the ophthalmosaurids. *Zoological Journal of the Linnean Society*, 118, 180–201.
  DOI: 10.1093/zoolinnean/zlz095.
- CARROLL, R.L. & ZHI-MING, D. 1991. *Hupehsuchus*, an enigmatic aquatic reptile from the Triassic of China, and the problem of establishing relationships. *Philosophical Transactions of the Royal Society B: Biological Sciences*, **331**, 131–153. DOI: 10.1098/rstb.1991.0004.
- CARTER, A.M. 1846. Notice of the Jaws of an *Ichthy-osaurus* from the Chalk in the Neighbourhood of Cambridge. *Report of the British Association for the Advancement of Science*, **15**, 60.
- CHEN, L. 1985. Ichthyosaurs from the Lower Triassic of Chao County, Anhui. *Regional Geology of China*, **15**, 139–146.
- CHEN, X.-h. & CHENG, L. 2010. A new species of Mixosaurus (Reptilia: Ichthyosauria) from the Middle Triassic of Pu'an, Guizhou, China. Acta Palaeontologica Sinica, 49, 251–260.
- ---- & SANDER, P.M. 2007. A new species of *Callawayia* (Reptilia: Ichthyosauria) from

- the Late Triassic in Guanling, Guizhou. *Geology in China*, **34**, 974–982.
- ---, SANDER, P.M., CHENG, L. & WANG, X. 2013.

  A new Triassic primitive ichthyosaur from Yuanan, South China. *Acta Geologica Sinica*, **87**, 672–677. DOI: 10.1111/1755-6724.12078.
- ——, MOTANI, R., CHENG, L., JIANG, D. & RIEP-PEL, O.C. 2014a. A small short-necked hupehsuchian from the Lower Triassic of Hubei Province, China. PLoS ONE, 9, e115244. DOI: 10.1371/journal.pone.0115244.
- ---- & ---- & ---- 2014b. A carapace-like bony body tube in an Early Triassic marine reptile and the onset of marine tetrapod predation. *PLoS ONE*, **9**, e94396. DOI: 10.1371/journal.pone.0094396.
- ---- & ---- 2015. A new specimen of Carroll's mystery hupehsuchian from the Lower Triassic of China. *PLoS ONE*, **10**, e0126024. DOI: 10.1371/journal.pone.0126024.
- CHEN, X., MOTANI, R., CHENG, L., JIANG, D. & RIEPPEL, O.C. 2014c. The enigmatic marine reptile *Nanchangosaurus* from the Lower Triassic of Hubei, China and the phylogenetic affinities of Hupehsuchia. *PLoS ONE*, **9**, e102361. DOI: 10.1371/journal.pone.0102361.
- CONYBEARE, W.D. 1822. Additional notices on the fossil genera *Ichthyosaurus* and *Plesiosaurus*. *Transactions of the Geological Society of London*, **1**, 103–123. DOI: 10.1144/transgslb. 1.1.103.
- CORTÉS, D., MAXWELL, E.E. & LARSSON, H.C.E. 2021. Re-appearance of hypercarnivore ichthyosaurs in the Cretaceous with differentiated dentition: revision of 'Platypterygius' sachicarum (Reptilia: Ichthyosauria, Ophthalmosauridae) from Colombia. Journal of Systematic Palaeontology, 1–34. DOI: 10.1080/14772019.2021.1989507.
- CUTHBERTSON, R.S., RUSSELL, A.P. & ANDERSON, J.S. 2013. Cranial morphology and relationships of a new grippidian (Ichthyopterygia) from the Vega-Phroso Siltstone Member (Lower Triassic) of British Columbia, Canada. *Journal of Vertebrate Paleontology*, **33**, 831-847. DOI: 10.1080/02724634.2013.755989.
- Dal Sasso, C. & Pinna, G. 1996. *Besanosaurus* leptorhynchus n. gen. n. sp. a new shastasaurid ichthyosaur from the Middle Triassic of Besano (Lombardy, N. Italy). *Paleontologia* Lombarda, **4**, 3–23.
- DELSETT, L.L., NOVIS, L.K., ROBERTS, A.J., KOE-VOETS, M.J., HAMMER, Ø., DRUCKENMILLER, P.S. & HURUM, J.H. 2016. The Slottsmøya marine reptile Lagerstätte: depositional environments, taphonomy and diagenesis. *Geological Society, London, Special Publications*, **434**, 165–188. DOI: 10.1144/SP434.2.

- DELSETT, L.L., ROBERTS, A.J., DRUCKENMILLER, P.S. & HURUM, J.H. 2017. A new ophthalmosaurid (Ichthyosauria) from Svalbard, Norway, and evolution of the ichthyopterygian pelvic girdle. *PLoS ONE*, **12**, e0169971–39. DOI: 10.1371/journal.pone.0169971.
- ——, DRUCKENMILLER, P.S., ROBERTS, A.J. & HURUM, J.H. 2018. A new specimen of *Palvennia hoybergeti:*: implications for cranial and pectoral girdle anatomy in ophthalmosaurid ichthyosaurs. *PeerJ*, **6**, e5776. DOI: 10.7717/peerj.5776.
- DRUCKENMILLER, P.S. & MAXWELL, E.E. 2010. A new Lower Cretaceous (lower Albian) ichthyosaur genus from the Clearwater Formation, Alberta, Canada. *Canadian Journal of Earth Sciences*, **47**, 1037–1053. DOI: 10.1139/E10-
- ——, HURUM, J.H., KNUTSEN, E.M. & NAKREM, H.A. 2012. Two new ophthalmosaurids (reptilia: ichthyosauria) from the agardhfjellet formation (upper jurassic: volgian/tithonian), svalbard, norway. Norwegian Journal of Geology, 92, 311–339.
- EFIMOV, V.M. 1998. The ichthyosaur *Otschevia* pseudoscythica gen. et sp. nov. from the Upper Jurassic of Ulyanovsk Volga. *Paleontologicheskii Zhurnal*, **1998**, 82–86.
- —— 1999a. Ichthyosaurs of a new genus Yasykovia from the Upper Jurassic strata of European Russia. Paleontologicheskii Zhurnal, 1999, 91–98.
- —— 1999b. A new family of ichthyosaurs, the Undorosauridae fam. nov. from the Volgian Stage of the European part of Russia. *Paleontologicheskii Zhurnal*, 1999, 174–181.
- FERNÁNDEZ, M.S. 1994. A new long-snouted ichthyosaur from the Early Bajocian of Neuquén Basin (Argentina). *Ameghiniana*, **31**, 291–297.
- —— 1997. A new ichthyosaur from the Tithonian (Late Jurassic) of the Neuquén Basin, northwestern Patagonia, Argentina. *Journal of Paleontology*, 71, 479–484. DOI: 10.1017 / S0022336000039494.
- —— 1999. A new ichthyosaur from the Los Molles Formation (Early Bajocian), Neuquen Basin, Argentina. *Journal of Paleontology*, **73**, 677–681. DOI: 10.1017/S0022336000032492.
- —— 2007. Ichthyosauria. In *Patagonian Mesozoic Reptiles*. Ed. by Z. Gasparini, R.A. Coria & L. Salgado.
- ——, CAMPOS, L., MAXWELL, E.E. & GARRIDO, A.C. 2021. Catutosaurus gaspariniae, gen. et sp. nov. (Ichthyosauria, Thunnosauria) of the Upper Jurassic of Patagonia and the evolution of the ophthalmosaurids. Journal of Vertebrate Paleontology, e1922427. DOI: 10.1080/02724634.2021.1922427.
- FISCHER, V. 2016. Taxonomy of *Platypterygius campylodon* and the diversity of the last ichthyosaurs. *PeerJ*, **4**, e2604–21. DOI: 10 . 7717 / peerj . 2604.
- ——, MASURE, E., ARKHANGELSKY, M.S. & GODE-FROIT, P. 2011. A new Barremian (Early Cretaceous) ichthyosaur from western Russia.

- Journal of Vertebrate Paleontology, **31**, 1010–1025. DOI: 10 . 1080 / 02724634 . 2011 . 595464
- ——, MAISCH, M.W., NAISH, D., KOSMA, R., LISTON, J.J., JOGER, U., KRÜGER, F.J., PÉREZ, J.P., TAINSH, J. & APPLEBY, R.M. 2012. New ophthalmosaurid ichthyosaurs from the European Lower Cretaceous demonstrate extensive ichthyosaur survival across the Jurassic-Cretaceous boundary. PLoS ONE, 7, e29234–2. DOI: 10.1371/journal.pone.0029234.
- ---, APPLEBY, R.M., NAISH, D., LISTON, J.J., RID-ING, J.B., BRINDLEY, S. & GODEFROIT, P. 2013. A basal thunnosaurian from Iraq reveals disparate phylogenetic origins for Cretaceous ichthyosaurs. *Biology Letters*, **9**, 20130021-20130021. DOI: 10 . 1098 / rsbl . 2013 .
- ——, BARDET, N., GUIOMAR, M. & GODEFROIT, P. 2014a. High diversity in Cretaceous ichthyosaurs from Europe prior to their extinction. PLoS ONE, 9, e84709. DOI: 10.1371/ journal.pone.0084709.
- ——, ARKHANGELSKY, M.S., USPENSKY, G.N., STENSHIN, I.M. & GODEFROIT, P. 2014b. A new Lower Cretaceous ichthyosaur from Russia reveals skull shape conservatism within Ophthalmosaurinae. *Geological Magazine*, **151**, 60–70. DOI: 10.1017/S0016756812000994.
- FRAAS, E. 1891. *Die Ichthyosaurier Der Süddeutschen Trias-und Jura-Ablagerungen.*Tübingen: Verlag der H. Laupp'schen Buchhandlung.
- Frey, E. & Stinnesbeck, W. 2014. Mexican ichthyosaurs. 99–109. In *Dinosaurs and Other Reptiles from the Mesozoic of Mexico*. Ed. by H.E. Rivera-Sylva, K. Carpenter & E. Frey.
- FRÖBISCH, N.B., SANDER, P.M. & RIEPPEL, O.C. 2006. A new species of *Cymbospondylus* (Diapsida, Ichthyosauria) from the Middle Triassic of Nevada and a re-evaluation of the skull osteology of the genus. *Zoological Journal of the Linnean Society*, **147**, 515–538. DOI: 10.1111/j.1096-3642.2006.00225.x.
- ——, FRÖBISCH, J., SANDER, P.M., SCHMITZ, L. & RIEPPEL, O.C. 2013. Macropredatory ichthyosaur from the Middle Triassic and the origin of modern trophic networks. *Proceedings of the National Academy of Sciences*, 110, 1393–1397. DOI: 10.1073/pnas.1216750110.
- GASPARINI, Z. 1988. Ophthalmosaurus monocharactus appleby (Reptilia, Ichthyopterygia), en las calizas lithograficas tithonianas del area Los Catutos, Neuquén, Argentina. Ameghiniana. 25, 3–16.
- Huang, J.-d., Motani, R., Jiang, D.-y., Tintori, A., Rieppel, O., Zhou, M., Ren, X.-X. & Zhang, R. 2019. The new ichthyosauriform *Chaohusaurus brevifemoralis* (Reptilia, Ichthyosauromorpha) from Majiashan, Chaohu, Anhui Province, China. *PeerJ*, **7**, e7561. Doi: 10.7717/peerj.7561.
- HULKE, J.W. 1871. Note on an *Ichthyosaurus* (*I. enthekiodon*) from Kimmeridge Bay, Dorset. *Quarterly Journal of the Geological Society*,

- **27**, 440-441. DOI: 10 . 1144 / GSL . JGS . 1871.027.01-02.52.
- Jacobs, M.L. & Martill, D.M. 2020. A new ophthalmosaurid ichthyosaur from the upper jurassic (early tithonian) kimmeridge clay of dorset, uk, with implications for late jurassic ichthyosaur diversity. *PLOS ONE*, **15**, e0241700. DOI: 10.1371/journal.pone.0241700.
- Jäger, M. 2005. The Museum of Fossils in the Werkforum: Guidebook of the Exhibition of Jurassic Fossils. 3rd ed. Holcim: Dotternhausen, Germany.
- JIANG, D., MOTANI, R., HUANG, J.-D., TINTORI, A., HU, Y.-C., RIEPPEL, O.C., FRASER, N.C., JI, C., KELLEY, N.P., FU, W. & ZHANG, R. 2016. A large aberrant stem ichthyosauriform indicating early rise and demise of ichthyosauromorphs in the wake of the end-permian extinction. *Scientific Reports*, **6**, 26232–9. DOI: 10.1038/srep26232.
- JIANG, D.-y., SCHMITZ, L., HAO, W. & SUN, Y.-l. 2006. A new mixosaurid ichthyosaur from the Middle Triassic of China. *Journal of Vertebrate Paleontology*, **26**, 60–69. DOI: 10.1671/0272-4634(2006)26[60:ANMIFT]2.0.C0;2.
- ——, MOTANI, R., HAO, W., SCHMITZ, L., RIEPPEL, O.C., SUN, Y.-l. & SUN, Z.-y. 2008. New primitive ichthyosaurian (Reptilia, Diapsida) from the Middle Triassic of Panxian, Guizhou, southwestern China and its position in the Triassic biotic recovery. *Progress in Natural Science*, **18**, 1315–1319. DOI: 10.1016/j.pnsc.2008.01.039.
- Kuhn, O. 1934. Pars 63: Ichthyosauria. 1–76. In Fossilium catalogus. I: Animalia. Ed. by W. Ouenstedt.
- —— 1946. Ein Skelett von Ichthyosaurus (Platypterygius) hercynicus n. sp. aus dem Aptium von Gitter. Bericht der Naturforschenden Gesellschaft in Bamberg, 29, 69–82.
- LEIDY, J. 1868. Notice of some reptilian remains from Nevada. *Proceedings of the Academy of Natural Sciences of Philadelphia*, **20**, 177–178.
- Li, C. 1999. Ichthyosaur from guizhou, china. *Chinese Science Bulletin*, **44**, 1329–1333. DOI: 10.1007/BF02885856.
- LOMAX, D.R. 2016. A new leptonectid ichthyosaur from the Lower Jurassic (Hettangian) of Nottinghamshire, England, UK, and the taxonomic usefulness of the ichthyosaurian coracoid. *Journal of Systematic Palaeontology*, **15**, 1–15. DOI: 10 . 1080 / 14772019 . 2016 . 1183149.
- —— & MASSARE, J.A. 2015. A new species of *Ich-thyosaurus* from the Lower Jurassic of West Dorset, England, U.K. *Journal of Vertebrate Paleontology*, **35**, e903260. DOI: 10.1080/02724634.2014.903260.
- ---- & ---- 2017. Two new species of *Ichthy-osaurus* from the lowermost Jurassic (Hettangian) of Somerset, England. *Papers in Palaeontology*, **3**, 1–20. DOI: 10 . 1002 / Spp2 . 1065.

- ———— & MISTRY, R.T. 2017. The taxonomic utility of forefin morphology in Lower Jurassic ichthyosaurs: Protoichthyosaurus and Ichthyosaurus. Journal of Vertebrate Paleontology, 37, e1361433. DOI: 10.1080/02724634. 2017.1361433.
- LYDEKKER, R. 1888. Ichthyosaurus acutirostris, Zetlandicus & longifrons. Geological Magazine, **6**, 44. DOI: 10 . 1017 / S0016756800175818.
- M'Coy, F. 1867. On the occurrence of *Ichthyosaurus* and *Plesiosaurus* in Australia. *Annals and Magazine of Natural History*, **19**, 1–3.
- MAISCH, M.W. 2008. Revision der Gattung Stenopterygius Jaekel, 1904 emend. von Huene, 1922 (Reptilia: Ichthyosauria) aus dem unteren Jura Westeuropas. *Palaeodiversity*, 1, 227–271.
- —— 2010. Phylogeny, systematics, and origin of the ichthyosauria – the state of the art. Palaeodiversity, 3, 151–214.
- —— & MATZKE, A.T. 1997. Mikadocephalus gracilirostris n. gen., n. sp. a new ichthyosaur from the grenzbitumenzone (anisian–ladinian) of monte san giorgio (switzerland). Paläontologische Zeitschrift, 71, 267–289. DOI: 10.1007/BF02988496.
- —— & —— 1998a. Observations on triassic ichthyosaurs. part ii: a new ichthyosaur with palatal teeth from monte san giorgio. Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, 1998, 26–41. DOI: 10.1127/njgpm/1998/1998/26.
- —— & —— 1998b. Observations on Triassic ichthyosaurs. Part III: A crested predatory mixosaurid from the Middle Triassic of the Germanic Basin. Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 209, 105–134.
- —— & —— 2000. The ichthyosauria. Stuttgarter Beiträge zur Naturkunde, Serie B (Geologie und Paläontologie), 298, 1–159.
- ——— & ——— 2003. Observations on triassic ichthyosaurs. part xii. a new early triassic ichthyosaur genus from spitzbergen. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen*, **229**, 317–338. DOI: 10 . 1127/njgpa/229/2003/317.
- MANTELL, G.A. 1851. Petrifactions and Their Teachings; Or, a Hand-book to the Gallery of Organic Remains of the British Museum. London: Henry G. Bohn.
- Marsh, O.C. 1879. A new order of extinct reptiles (Sauranodonta) from the Jurassic Formation of the Rocky Mountains. *Annals and Magazine of Natural History*, **3**, 175–176. DOI: 10.1080/00222937908682501.
- MARTIN, J.E., FISCHER, V., VINCENT, P. & SUAN, G. 2012. A longirostrine *Temnodontosaurus* (Ichthyosauria) with comments on Early Jurassic ichthyosaur niche partitioning and disparity. *Palaeontology*, **55**, 995–1005. DOI: 10.1111/j.1475-4983.2012.01159.x.
- MATTHEWS, S.C. 1973. Notes on open nomenclature and on synonymy lists. *Palaeontology*, **16**, 713–719. DOI: 10.1234/12345678.

- MAXWELL, E.E. & CALDWELL, M.W. 2006. A new genus of ichthyosaur from the Lower Cretaceous of Western Canada. *Palaeontology*, **49**, 1043–1052. DOI: 10 . 11111/j.1475-4983.2006.00589.x.
- —— & CORTÉS, D. 2020. A revision of the Early Jurassic ichthyosaur *Hauffiopteryx* (Reptilia: Ichthyosauria), and description of a new species from southwestern Germany. *Palaeontologia Electronica*. DOI: 10.26879/937.
- ——, FERNÁNDEZ, M.S. & SCHOCH, R.R. 2012. First diagnostic marine reptile remains from the Aalenian (Middle Jurassic): a new ichthyosaur from southwestern Germany. *PLoS ONE*, 7, e41692. DOI: 10.1371/journal.pone. 0041692.
- ——, DICK, D.G., PADILLA, S. & PARRA, M.L. 2016.

  A new ophthalmosaurid ichthyosaur from the Early Cretaceous of Colombia. *Papers in Palaeontology*, **2**, 59–70. DOI: 10 . 1002 / spp2 . 1030.
- MAZIN, J.-M., SUTEETHORN, V., BUFFETAUT, E.,
  JAEGER, J.-J. & ELMCKE-INGAVAT, R. 1991. Preliminary description of *Thaisaurus chonglakmanii* n.g., n.sp., a new ichthyopterygian
  (Reptilia) from the Early Triassic of Thailand.
  Comptes rendus de l'Académie des sciences.
  Série 2, Mécanique, Physique, Chimie, Sciences
  de l'univers, Sciences de la Terre, 313, 1207-
- McGowan, C. 1972. The systematics of Cretaceous ichthyosaurs with particular reference to the material from North America. *Contributions to Geology, University of Wyoming*, **2**, 9–29.
- —— 1974. A revision of the longipinnate ichthyosaurs of the Lower Jurassic of England, with descriptions of two new species. *Life Sciences Contributions of the Royal Ontario Museum*, 97, 1–37. DOI: 10.5962/bhl.title.52055.
- ——— 1976. The description and phenetic relationships of a new Ichthyosaur genus from the Upper Jurassic of England. *Canadian Journal of Earth Sciences*, **13**, 668–683. DOI: 10.1139/e76–070.
- —— 1986. A putative ancestor for the swordfishlike ichthyosaur *Eurhinosaurus*. *Nature*, **322**, 454–456. DOI: 10.1038/322454a0.
- —— 1993. A new species of large, long-snouted ichthyosaur from the English lower Lias. Canadian Journal of Earth Sciences, 30, 1197–1204.
  DOI: 10.1139/e93-101.
- —— 1994. A new species of Shastasaurus (Reptilia: Ichthyosauria) from the Triassic of British Columbia: the most complete exemplar of the genus. Journal of Vertebrate Paleontology, 14, 168–179. DOI: 10.1080/02724634.1994.10011550.
- —— 1995. A remarkable small ichthyosaur from the Upper Triassic of British Columbia, representing a new genus and species. *Canadian Journal of Earth Sciences*, **32**, 292–303. DOI: 10.1139/e95-024.
- —— 1996. A new and typically Jurassic ichthyosaur from the Upper Triassic of British

- Columbia. *Canadian Journal of Earth Sciences*, **33**, 24–32. DOI: 10.1139/e96–003.
- —— & MILNER, A.C. 1999. A new Pliensbachian ichthyosaur from Dorset, England. *Palaeon-tology*, **42**, 761–768. DOI: 10.1111/1475–4983.00096.
- ——— & MOTANI, R. 2003. *Ichthyopterygia*. Ed. by H.-D. Sues. **8**. Handbook of Paleoherpetology. Munich: Verlag Dr. Friedrich Pfeil. 175 pp.
- MERRIAM, J.C. 1895. On some reptilian remains from the Triassic of Northern California. *American Journal of Science*, **50**, 55–57. DOI: 10.2475/ajs.s3–50.295.55.
- —— 1902. Triassic Ichthyopterygia from California and Nevada. *University of California*, *Bulletin of the Department of Geology*, 3, 63– 108.
- —— 1903. New ichthyosauria from the Upper Triassic of California. University of California, Bulletin of the Department of Geology, 3, 249– 263.
- —— 1905. The types of limb-structure in the Triassic Ichthyosauria. American Journal of Science, 19, 23–30. DOI: 10.2475/ajs.s4-19.109.23.
- —— 1910. The skull and dentition of a primitive ichthyosaurian from the Middle Triassic. University of California, Bulletin of the Department of Geology, 5, 381–390.
- MOTANI, R. & You, H. 1998a. The forefin of Chensaurus chaoxianensis (Ichthyosauria) shows delayed mespodial ossification. Journal of Paleontology, 72, 133–136. DOI: 10.1017/S0022336000024069.
- ---- & ---- 1998b. Taxonomy and limb ontogeny of *Chaohusaurus geishanensis* (Ichthyosauria), with a note on the allometric equation. *Journal of Vertebrate Paleontology*, **18**, 533-540. DOI: 10.1080/02724634.1998.
- ——, JIANG, D.-Y., CHEN, G., TINTORI, A., RIEP-PEL, O., JI, C. & HUANG, J.-D. 2015a. A basal ichthyosauriform with a short snout from the lower triassic of china. *Nature*, **517**, 485–488. DOI: 10.1038/nature13866.
- ---, Jiang, D., Tintori, A., Rieppel, O.C., Chen, G. & You, H. 2015b. Status of Chaohusaurus chaoxianensis (Chen, 1985). Journal of Vertebrate Paleontology, **35**, e892011. doi: 10.1080/02724634.2014.892011.
- NACE, R.L. 1939. A new ichthyosaur from the Upper Cretaceous Mowry formation of Wyoming. American Journal of Science, **237**, 673–686. DOI: 10.2475/ajs.237.9.673.
- NICHOLLS, E.L. & BRINKMAN, D.B. 1995. A new ichthyosaur from the Triassic Sulphur Mountain formation of British Columbia. 521–535. In Vertebrate Fossils and the Evolution of Scientific Concepts. Ed. by W.A.S. Sarjeant.
- —— & MANABE, M. 2001. A new genus of ichthyosaur from the Late Triassic Pardonet Formation of British Columbia: bridging the Triassic Jurassic gap. Canadian Journal of Earth Sciences, 38, 983–1002. DOI: 10.1139/cjes-38-6-983.

- ---- & ---- 2004. Giant ichthyosaurs of the Triassic—a new species of *Shonisaurus* from the Pardonet Formation (Norian: Late Triassic) of British Columbia. *Journal of Vertebrate Paleontology*, **24**, 838-849. DOI: 10.1671/0272-4634(2004)024[0838:GIOTTN]2.0.CO;2.
- OTSCHEV, V.G. & EFIMOV, V.M. 1985. A new genus of ichthyosaur from the Ulyanovsk Volga Region. Paleontologicheskii Zhurnal, 1985, 76–80.
- Owen, R. 1840. Report on British fossil reptiles. Part I. Report of the British Association for the Advancement of Science, **9**, 43–126.
- —— 1881. A monograph of the fossil Reptilia of the Liassic Formations. Part Third. *Ichthy-osaurus*. *Monograph of the Palaeontographical Society*, **35**, 83–134. DOI: 10 . 1080 / 02693445.1881.12027969.
- Paparella, I., Maxwell, E.E., Cipriani, A., Roncacè, S. & Caldwell, M.W. 2016. The first ophthalmosaurid ichthyosaur from the Upper Jurassic of the Umbrian–Marchean Apennines (Marche, Central Italy). *Geological Magazine*, **154**, 837–858. doi: 10.1017/ S0016756816000455.
- PÁRAMO-FONSECA, M.E. 1997. *Platypterygius sachi-carum* (Reptilia, Ichthyosauria) nueva especie del Cretácico de Colombia. *Revista Ingeominas*, **6**, 1–12.
- QUENSTEDT, F.A. 1852. *Handbuch der Petrefakten-kunde*. Tübingen: Verlag der H. Laupp'schenn Buchhandlung.
- ——— 1858. *Der Jura*. Tübingen: Verlag der H. Laupp'schenn Buchhandlung.
- ROBERTS, A.J., DRUCKENMILLER, P.S., SÆTRE, G.-P. & HURUM, J.H. 2014. A new Upper Jurassic ophthalmosaurid ichthyosaur from the Slottsmøya Member, Agardhfjellet formation of Central Spitsbergen. *PLoS ONE*, **9**, e103152. DOI: 10.1371/journal.pone.0103152.
- ROMER, A.S. 1968. An ichthyosaur skull from the Cretaceous of Wyoming. *Contributions to Geology, University of Wyoming*, **7**, 27–41.
- Russell, D. 1993. Jurassic marine reptiles from Cape Grassy, Melville Island, Arctic Circle. *Bulletin of the Geological Survey of Canada*, **6**, 195–201.
- SANDER, P.M. 1989. The large ichthyosaur *Cymbospondylus buchseri*, sp. nov. from the Middle Triassic of Monte San Giorgio (Switzerland), with a survey of the genus in Europe. *Journal of Vertebrate Paleontology*, **9**, 163–173. DOI: 10 . 1080 / 02724634 . 1989 . 10011750.
- —— 1997. The paleobiogeography of Shastasaurus. 1–27. In Ancient Marine Reptiles. Ed. by J.M. Callaway & E.L. Nicholls. DOI: 10.1016/ B978–0–12–155210–7. X5000–5.
- ——, GRIEBELER, E.M., KLEIN, N., JUARBE, J.V., WINTRICH, T., REVELL, L.J. & SCHMITZ, L. 2021. Early giant reveals faster evolution of large body size in ichthyosaurs than in cetaceans. *Science*, **374**, eabf5787. DOI: 10.1126/ science.abf5787.

- SCHMITZ, L., SANDER, P.M., STORRS, G.W. & RIEP-PEL, O.C. 2004. New Mixosauridae (Ichthyosauria) from the Middle Triassic of the Augusta Mountains (Nevada, USA) and their implications for mixosaur taxonomy. *Palaeontographica Abteilung A: Paläozoologie—Stratigraphie*, **270**, 133–162.
- SEELEY, H.G. 1869. Index to the Fossil Remains of Aves, Ornithosauria, and Reptilia from the Secondary System of Strata Arranged in the Woodwardian Museum of the University of Cambridge. Cambridge: Deighton, Bell, and Co.
- —— 1873. On Cetarthrosaurus walkeri (Seeley), an ichthyosaurian from the Cambridge Upper Greensand. Quarterly Journal of the Geological Society, 29, 505–507. DOI: 10.1144/GSL. JGS.1873.029.01–02.43.
- —— 1874. On the pectoral arch and fore limb of *Ophthalmosaurus*, a new ichthyosaurian genus from the Oxford Clay. *Quarterly Journal of the Geological Society*, **30**, 696–707. DOI: 10.1144/GSL.JGS.1874.030.01-04.64.
- SHIKAMA, T., KAMEI, T. & MURATA, M. 1978. Early Triassic *Ichthyosaurus*, *Utatsusaurus hataii* gen. et sp. nov., from the Kitakami Massif, Northeast Japan. *Science Reports of Tohoku University (Geology)*, **48**, 77–97.
- Tyborowski, D. 2016. A new ophthalmosaurid ichthyosaur species from the Late Jurassic of Owadów-Brzezinki Quarry, Poland. *Acta Palaeontologica Polonica*, **61**, 791–803. DOI: 10.4202/app.00252.2016.
- VON EICHWALD, C.E. 1853. Einige palaeontologische Bemerkungen über den Eisenstand von Kursk. Bulletin de la Société impériale des naturalistes de Moscou, **25**, 209–231.
- VON HUENE, F.F. 1927. Beitrag zur Kenntnis mariner mesozoischer Wirbeltiere in Argentinien. Zentralblatt für Mineralogie, Geologie und Palänontologie. B., 1927, 22–29.
- —— 1916. Beiträge zur Kenntnis der Ichthyosaurier im deutschen Muschelkalk. Palaeontographica, 62, 1–68.
- —— 1922. Die Ichthyosaurier des Lias und Ihre Zusammenhänge. Berlin: Verlag von Gebrüder Borntraeger. 114 pp.
- —— 1926. Neue Ichthyosaurierfunde aus dem schwäbischen Lias. Neues Jahrbuch für Mineralgie, Geologie und Paläontologie, Beilage Band B, 55, 66–86.
- —— 1931a. Neue Ichthyosaurier aus Württemburg. Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, Beilage-Band B, 65, 305–320.
- —— 1931b. Neue Studien über Ichthyosaurier aus Holzmaden. Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft, 42, 345– 382.
- VON MEYER, H. 1849. Fossile Fische aus dem Muschelkalk von Jena, Querfurt und Esperstädt. *Palaeontographica*, 1–16.
- VON THEODORI, C. 1843. Über einen kolossalen Ichthyosaurus trigonodon. Gelehrte Anzei-

- gen Königliche Akademie der Wissenschaften. Mathematisch-Physikalisch Classe, **34**, 905– 912
- WAGNER, A. 1853. Die Characteristic einer neuen Art von *Ichthyosaurus* aus den lithographischen Schiefern und eines Zahnes von *Polyptychodon* aus dom Gründsandstein von Kelheim. *Bulletin der königliche Akademie der Wissenschaft, Gelehrte Anzeigen*, **3**, 25–35.
- Wang, K. 1959. Ueber eine neue fossile Reptilform von Provinz Hupeh, China. *Acta Palaeontologica Sinica*, **7**, 47–52.
- WIMAN, C. 1910. Ichthyosaurier aus der Trias Spitzbergens. *Bulletin of the Geological In*stitute of Upsala, **10**, 124–148.
- ——— 1929. Eine neue marine Reptilien-Ordnung aus der Trias Spitzbergens. Bulletin of the Geological Institute of Upsala, 22, 1–14.
- YANG, P.-F., CHENG, J., JIANG, D.-y., MOTANI, R., TINTORI, A., SUN, Y.-I. & SUN, Z.-y. 2013. A new species of *Qianichthyosaurus* (Reptilia: Ichthyosauria) from Xingyi Fauna (Ladinian, Middle Triassic) of Guizhou. *Acta Scientiarum* Naturalium Universitatis Pekinensis, **49**, 1002– 1008.
- YIN, G.-z., ZHOU, X., CAO, Z., YU, Y. & LUO, Y. 2000. A preliminary study on the Early Late Triassic marine reptiles from Guanling, Guizhou, China. Geology, Geochemistry, 28, 1–23.
- YOUNG, C.-C. & DONG, Z.M. 1972. On the Triassic marine reptiles of China. *Memoires of the Nanjing Institute of Geology and Palaeontology*, **9**, 1–34.
- ZHOU, M., JIANG, D., MOTANI, R., TINTORI, A., JI, C., SUN, Z.-Y., NI, P.-G. & LU, H. 2017. The cranial osteology revealed by three-dimensionally preserved skulls of the Early Triassic ichthyosauriform *Chaohusaurus chaoxianensis* (Reptilia: Ichthyosauromorpha) from Anhui, China. *Journal of Vertebrate Paleontology*, **37**, e1343831. DOI: 10.1080/02724634.2017.1343831.
- ZVERKOV, N.G. & EFIMOV, V.M. 2019. Revision of Undorosaurus, a mysterious late jurassic ichthyosaur of the boreal realm. Journal of Systematic Palaeontology, 17, 1183–1213. DOI: 10.1080/14772019.2018.1515793.
- —— & PRILEPSKAYA, N.E. 2019. A prevalence of Arthropterygius (Ichthyosauria: Ophthalmosauridae) in the Late Jurassic–Earliest Cretaceous of the Boreal Realm. PeerJ, 7, e6799. DOI: 10.7717/peerj.6799.
- —— & JACOBS, M.L. 2020. Revision of *Nannopterygius* (ichthyosauria: ophthalmosauridae): reappraisal of the 'inaccessible' holotype resolves a taxonomic tangle and reveals an obscure ophthalmosaurid lineage with a wide distribution. *Zoological Journal of the Linnean Society*, **191**, 228–275. DOI: 10.1093 / zoolinnean/zlaa028.
- ——, ARKHANGELSKY, M.S. & STENSHIN, I.M. 2015. A review of Russian Upper Jurassic ichthyosaurs with an intermedium/humeral contact. Reassessing *Grendelius* McGowan, 1976.

*Proceedings of the Zoological Institute RAS*, **319**, 558–588.

----, GRIGORIEV, D.V., WOLNIEWICZ, A.S., KON-STANTINOV, A.G. & SOBOLEV, E.S. 2021. Ichthyosaurs from the Upper Triassic (Carnian–Norian) of the New Siberian Islands, Russian Arctic, and their implications for the evolution of the ichthyosaurian basicranium and vertebral column. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh*, 1–24. DOI: 10.1017/S1755691021000372.