

Fossil range expansions continue

Michael J. Oard

Creationists have regularly published on fossil range expansions. They have found in the conventional geological literature either fossils that conventional geologists believe are older, or living fossils that extend the fossil range upward in the geological column to the present. The most recent publication was in 2019.¹ Not many of these are major changes in the dates or important fossils in the evolutionary story, but a few are. Regardless, this series of perspective articles shows that the fossils in the geological column appear less ordered than previously thought.

After five years, there are many more fossil range expansions. Several push back the dates by tens of millions of years or are important organisms within the evolutionary story. There are likely more range expansions than reported on here, since these were found only while doing my research.

Earth's earliest metazoan animal?

The beginning of 'complex' animals is debated among evolutionary paleontologists. Igniting further debate is the discovery of what could be sponges or sponge-like animals 890 Ma ago, 350 Ma older than the oldest undisputed sponges from the Cambrian period.^{2,3} The 'molecular clock' supports the origin of metazoans back into the early Neoproterozoic, so finding sponges that 'old' is not unexpected. The Neoproterozoic is dated from 1 Ga to 541 Ma BP. It seems typical that molecular clocks indicate that an organism diverged from its supposed ancestor well before its earliest fossil occurrence.

The discoverer of the Neoproterozoic sponges is confident the structures are biological sponges, yet others are not. The critics also point out that this so-called ancient life would have to have gone through periods of extremely low oxygen levels and 'snowball Earth' episodes.³ Others have supported the discoverer by pointing out they have found traces of biological molecules, linked to sponges of that age.⁴

For creation scientists, this would mean that metazoans are much older than the Cambrian. It illustrates that a Precambrian/Cambrian pre-Flood/Flood boundary depends not on the *absence* of metazoan fossils in the Precambrian, but on the great increase in abundance of metazoans at that boundary. This also makes it more plausible to consider pre-Flood boundary locations other than the Precambrian/Cambrian boundary.

Predatory cnidarians pushed 30 Ma earlier into Ediacaran

The origin of jellyfish and corals, or cnidarians, has been a long-standing mystery.⁵ A new fossil found in the

United Kingdom has now pushed back the origin of cnidarians into the Ediacaran Period, but with a body plan much different from the strange Ediacaran fossils.⁶ Since cnidarians are predatory, the discovery also pushes back the origin of predatory behaviour about 30 Ma.

Jawed fish pushed back about 20 Ma

China seems to come up with some amazing fossils. This time the Chinese report that they have found jawed fish, armoured placoderms from the class Chondrichthyes, from the early Silurian.^{7,8} This pushes back the origin of jawed fish about 20 Ma. The variety of newly discovered jawed fish presents a puzzle: "How could a group that was already so diversified leave such a meagre record, particularly of whole fishes?"⁹ There should be more of them found in the Silurian, and their origin should go back to the Ordovician or even the Cambrian, where none have been found as yet. (Presumably fossil range expansion is tending toward the Cambrian Explosion being more explosive!)



Figure 1. The flat, branching bryozoan from Wisconsin, United States

Image: KennethGass, Wikimedia / CC BY-SA 4.0

Bryozoans pushed back into the Cambrian from the Ordovician

Bryozoans are a phylum of aquatic invertebrates, nearly all living in sedentary colonies. They are very diverse, with about 6,500 living species and 15,000 fossil species.¹⁰ They are typical Paleozoic fossils (figure 1) from the Ordovician upward in the geological column and are commonly used as index fossils. Typically, the ‘molecular clock’ claims that bryozoans evolved earlier than their fossil representatives, which were as old as the Ordovician. Moreover, six orders of bryozoans are found in the Ordovician, the variety suggesting that their origins must be in the Cambrian. Therefore, bryozoans should be part of the Cambrian Explosion, but they were not thought to be so until recently. Unequivocal bryozoans have now been found in the early Cambrian in China and Australia, pushing the origin of these animals back about 35 Ma.¹¹ Thus, fossils and the molecular clock have been reconciled and nearly all animal phyla have their origin in the Cambrian Explosion.

Digestive tracts now found in Ediacaran

‘First emergence’ dates for animal structures or characteristics are sometimes pushed back. The tube-dwelling *Cloudina* is an index fossil for the Ediacaran period of the late Neoproterozoic. It is considered a ‘primitive metazoan’. A new discovery from Nevada, USA, has revealed mineralized soft tissues within the external tubes.¹² The researchers believe that the mineralized soft tissue represents digestive tracts:

“Although alternative interpretations are plausible, these internal cylindrical structures may be most appropriately interpreted as digestive tracts, which would be, to date, the earliest-known

occurrence of such features in the fossil record.”¹³

Mineralized soft tissue has already been found from the Ediacaran period, but preserved digestive tracts have now been pushed back to the late Neoproterozoic. The researchers acknowledge that there are numerous reports of mineralized soft tissues: “Although they may be rare, there is no shortage of preserved internal soft-tissue structures reported from the fossil record.”¹⁴

Sound-producing system and tympanal ear in katydids pushed back 100 Ma

Another set of animal structures found in China pushed back in the fossil record is the sound-producing system and tympanal ear in katydids; these have been pushed back about 100 Ma.^{15,16} Furthermore, the sensors are identical to those found in today’s katydids. And, just as remarkable, such an amazing ability to hear sound is thought to have evolved multiple times: “For example, tympanal ears have evolved at least 18 times independently in diverse taxa of seven extant insect orders ... , involving at least 15 body locations”.¹⁷ The ability to produce sound has evolved independently in seven different orders of insects. Amazing ‘parallel evolution’!

Slime moulds now found in Burmese amber from the Mesozoic

Slime moulds, myxomycetes, which are common in most extant forests, especially in tropical and temperate ones, would be very difficult to preserve in the fossil record. Yet, they have been preserved in amber; for instance, in the early Cenozoic Baltic amber and in the late Cenozoic Dominican Republic amber. Slime moulds are now found in the famous

amber in northern Myanmar, which is dated as early Cretaceous, 100 Ma ago.¹⁸ Thus, the existence of slime moulds has been pushed back about 50 Myr in the fossil record. And, just as interesting, there is no change in morphology between these Cretaceous slime moulds and those that exist today. In other words, there is no evidence of morphological evolution. The researchers note that other groups of organisms remarkably show no change over time.

Origin of mammals pushed back 20 Ma

The oldest mammal was considered to be *Morganucodon* that lived about 205 Ma ago. Now a mammal has been found that is claimed to have lived 225 Ma ago, pushing back the origin of mammals 20 Ma.¹⁹ *Brasilodon quadrangularis*, found in southern Brazil, is only 20 cm from head to tail. It is considered difficult to distinguish between Triassic reptiles and mammals, because they are thought not to have diverged/diversified by that point in evolutionary history. Researchers have usually considered three inner ear bones as a diagnostic mammalian trait if they have the fossil material. In this case, the researchers determined that three skulls and associated dentary (lower jaw) bones were from mammals by an ingenious method.²⁰ Because the dentary bones were of different ages, they concluded that the animals had only two sets of teeth, common in mammals, whereas reptiles can erupt multiple sets of teeth.

Oldest known forest pushed back 2–3 Ma

Land plants are believed to have evolved in the late Precambrian, but the earliest fossil land plants are bryophytes (mosses) from the Ordovician.²¹ However, the origin of forests is another matter. They are

supposed to have begun in the mid Devonian Period. A new discovery of a forest in New York, USA, pushes back the origin of forests by 2–3 Ma.^{22,23} However, the researchers discovered that one of the three tree species pushed back its origin by 20 Ma. This tree is called *Archaeopteris* and has roots that extend 11 m, similar to modern conifers. Researchers did not know that such wide and complex root systems developed that far back: “Here we show that *Archaeopteris* had a highly advanced root system essentially comparable to modern seed plants.”²⁴ They also discovered evidence of the class Lycopsidea, pushing these trees back millions of years from the Carboniferous to the Devonian.

Earliest pelican discovered

The earliest fossil record of pelicans had come from the early Oligocene in southeastern France. Scientists have recently found a pelican from the late Eocene in Egypt that pushes back their origin 6 Ma.²⁵ Moreover, the pelicans indicate no change in beak morphology:

“This and other fossil pelicans, such as *Mioplecanus* (Cheneval, 1984), are so strikingly similar to modern pelicans they are hypothesized to indicate long-term stasis in feeding morphology.”²⁶

Conclusions

Many of these newly reported time range extensions do not push the origin date back that far or are in unimportant organisms within the evolutionary story. However, a few are significant, namely the possible 350 Ma extension of sponges into the early Neoproterozoic, extension back into the late Neoproterozoic Ediacaran Period of cnidarians, the extension of the origin of mammals back 20 Ma, and the conclusion that bryozoans are now part of the Cambrian explosion.

Also critically, most of these fossils are nearly identical to modern counterparts, showing little or no morphological evolution. Who knows what the fossil record will look like in a hundred or two hundred years.

References

- Oard, M.J., [More expansion of fossil time ranges](#), *J. Creation* 33(3):3–4, 2019.
- Turner, E.C., Possible poriferan body fossils in early Neoproterozoic microbial reefs, *Nature* 596:87–91, 2021.
- Kozlov, M., Sponge-like fossil could be earth’s earliest known animal, *Nature* 596:19, 2021.
- Gold, D.A., Grabenstatter, J., de Mendoza, A. *et al.*, and Summons, R.E., Sterol and genomic analyses validate the sponge biomarker hypothesis, *PNAS* 113(10):2684–2789, 2016.
- LaFlamme, M., Lifting the veil on the oldest-known animals, *Nature* 609:904–905, 2022.
- Dunn, F.S., Kenchington, C.G., Parry, L.A. *et al.*, A crown-group cnidarian from the Ediacaran of Charnwood Forest, UK, *Nature Ecology and Evolution* 6:1095–1104, 2022.
- Zhu, Y.-an, Li, Q., Lu, J. *et al.*, The oldest complete jawed vertebrates from the early Silurian of China, *Nature* 609:954–958, 2022.
- Andreev, P.S., Sansom, I.J., Li, Q. *et al.*, Spiny chondrichthyan from the lower Silurian of South China, *Nature* 609:969–974, 2022.
- Friedman, M., Fossils reveal the deep roots of jawed vertebrates, *Nature* 609:898, 2022.
- Ernst, A. and Wilson, M.A., Bryozoan fossils found at last in Cambrian deposits, *Nature* 599:203–204, 2021.
- Zhang, Z., Zhang, Z., Ma, J. *et al.*, Fossil evidence unveils an early Cambrian origin for Bryozoa, *Nature* 599:251–255, 2021.
- Schiffbauer, J.D., Selly, T., Jacquet, S.M. *et al.*, Discovery of bilaterian-type through-guts in cloudinomorpha from the terminal Ediacaran Period, *Nature Communications* 11:205, 2020.
- Schiffbauer *et al.*, ref. 12, p. 1.
- Schiffbauer *et al.*, ref. 12, p. 7.
- Xu, C., Wang, B., Wappler, T. *et al.*, High acoustic diversity and behavioral complexity of katydid in the Mesozoic soundscape, *PNAS* 119(51):1–8, 2022.
- De Jesús, E.G., Insect ears go back 160 million years, *Science News* 203(2):5, 2023.
- Xu *et al.*, ref. 15, p. 1.
- Rikinen, J., Grimaldi, D.A., and Schmidt, A.R., Morphological stasis in the first myxomycete from the Mesozoic, and the likely role of cryptobiosis, *Scientific Reports* 9:19730, 2019.
- Anonymous, [Brasilodon is earliest known mammal, new research shows](#), sci.news, 7 Sep 2022.
- Cabreira, S.F., Schultz, C.L., da Silva, L.R. *et al.*, Diphyodont tooth replacement of *Brasilodon*—a Late Triassic eucynodont that challenges the time of origin of mammals, *J. Anatomy* 241:1424–1440, 2022.
- Servais, T., Cascales-Miñana, B., Cleal, C.J. *et al.*, Revisiting the Great Ordovician Diversification of land plants: recent data and perspectives, *Palaeogeography, Palaeoclimatology, Palaeoecology* 534:109280, 2019.
- [Discovered the oldest forest in the world, dating back 386 million years](#), thearchaeologist.org, 5 Dec 2022.
- Stein, W.E., Berry, C.M., Morris, J.L. *et al.*, Mid-Devonian *Archaeopteris* roots signal revolutionary change in earliest fossil forests, *Current Biology* 30:421–431, 2020.
- Stein *et al.*, ref. 23, p. 421.
- El Adli, J.J., Wilson Mantilla, J.A., Antar, M.S.M., and Gingerich, P.D., The earliest recorded fossil pelican, recovered from the Late Eocene of Wadi Al-Hitan, Egypt, *J. Vertebrate Paleontology* 41:e1903910, 2021.
- El Adli *et al.*, ref. 25, p. 1.