Hybridization shaking up the evolutionary Tree of Life—what does it mean for creationists?

Jean K. Lightner

In 2016 *Science* featured an article with the provocative title "Shaking up the Tree of Life", stating: "Species were once thought to keep to themselves. Now hybrids are turning up everywhere, challenging evolutionary theory."[1] Despite its sensationalized tone, this article brings up a number of valuable points. To understand their significance, we first need to look at some history behind our understanding of species and observations regarding hybridization.

Historical views: hybrids in plants

Carolus Linnaeus (1707–1778) is best known for formalizing modern taxonomy. Based on his work, scientists continue to identify organisms using binomial nomenclature, which includes the genus and species name. It has been said that initially Linnaeus viewed each species as a distinctly created kind. Yet in his 1759 *Generatio Ambigena* he suggests that the originally created species have diversified into what he recognized as families. Based largely on his experience with hybrids in plants, he suggested that hybridization was a mechanism by which new species could arise.[2]

William Herbert (1778–1847) was a British clergyman and botanist who studied plants in the family Amaryllidaceae (e.g. narcissus or daffodils). He was a contemporary of Charles Darwin and even wrote Darwin a letter discussing hybrids in plants.[3] In his 1837 publication *Amaryllidaceae*, Herbert made a number of profound arguments still used by creationists today.[4] For example, he recognized that hybridization, regardless of whether or not the offspring were fertile, provides evidence that the parents "were descended from one common stock"[5] (i.e. both from the same created kind).

Herbert recognized that the variation seen between different varieties in a single species of domestic plant was essentially the same as that seen in different species in the wild. He pointed out that if fertility of offspring was the criteria for the species designation, many plant species recognized at that time would disappear, as morphologically distinct species would be grouped together. He also provided specific examples demonstrating that obvious morphological differences can be a poor predictor of whether or not fertile offspring can be produced when hybridizing.[6]

Herbert further considered the impact of the Flood on plant life. He suggested God designed the original created kinds capable of making permanent variations under different circumstances, such as different soil or climate conditions. He suggested that diversification was probably early and rapid following the Flood. While most of his discussion is centred around plants, he does briefly discuss his ideas in relation to birds and dogs. For example, he did not believe that all species needed to be on the Ark, and, based on personal experience, he believed foxes and dogs were part of the same kind.[7]

Elizabeth Pennisi's *Science* article alludes to Edgar Anderson's 1949 book *Introgressive Hybridization* as presenting novel ideas about the role of hybridization in plants.[8] Indeed, his work is important and did challenge the views of his contemporaries. However, as is evident by this short discussion, the popular views among scientists of that era were at odds with evidence that had been presented by eminent creation scientists more than a century before.

Species definitions vs kinds

Today the most popular definition of species can be traced back to Mayr's "Biological Species Concept", which defines a species as reproductively isolated from all other species. Generally, this is not tested because it is difficult to do so in the wild. Instead, inferences are made about whether or not the population considered will interbreed with other species under natural circumstances. There are also a number of other factors that come into play when biologists define species.[9]

It is important to note that eminent creation scientists of the past did not believe that species were fixed entities. As mentioned above, by 1759 Linnaeus believed that the created progenitors (kinds) had diversified to form the families of organisms that he identified. Note that this was a full century before Darwin published his famous work! Herbert, a contemporary of Darwin, felt that the genus should correspond to the level of the kind. When hybrid offspring were produced between members of different genera, regardless of fertility, he felt they should be reclassified to the same genus.[10]

Herbert's suggestion that the genus should be at the level of the kind is consistent with his comment that when offspring are formed from a cross, it was reasonable to believe that "the parents were descended from one common stock". The word genus essentially means just that, stock, and appears in many translations of Genesis for the Hebrew word *min* (kind).[11] However, there are times when hundreds or even a thousand

Figure 1. A new species of finch developed on Daphne Island when a large immigrant male from a related species mated with a medium ground finch on the island. Within a few years the hybrid offspring only mated among themselves, forming a reproductively isolated population; a new species.

or more species are connected by hybrid data.[12] Given that taxonomy is intended to provide a valuable tool for organizing and understanding the life God created, this would make the genus an unwieldy category when used to lump animals into 'kinds'.

Erich Wasmann was a Jesuit and renowned entomologist who was born in Austria in 1859, the year Darwin published his famous work. In *Modern Biology and the Theory of Evolution*, Wasmann argued for the theory of evolution in contrast to the theory of permanence (i.e. species fixity).[13] Using his extensive knowledge of ants and termites, he pointed out that species fixity would imply progressive creation. This is because many similar insect species have very specific symbiotic relationships with other insect species. To explain the patterns he details, either God created the original progenitors with the ability to form new relationships, or throughout history God would have had to create new species similar to ones he created previously.[14]

Despite Wasmann's use of the word evolution, he very clearly believed in the doctrine of creation as presented in Genesis 1. Based on observational evidence, he argued that the primitive forms God created diversified relatively rapidly to form different genera and sometimes families.[15] He insisted the only way to account for his observations was for God to have created organisms with interior 'laws' to allow them to respond beneficially to exterior influences.[16] He doubted natural selection played much of a role, since it cannot create anything new, but only removes some of what is already present.[17]

One thing that confuses the issue is the fact that the many words can be used in more than one sense. The word *species* is sometimes used to translate the Hebrew word *min* (kind) in Genesis 1.[18] Additionally, Linnaeus said that we reckon as many species as there were different forms created at the beginning.[19] Wasmann attempts to reconcile this by introducing the idea of natural species (equivalent to the modern creationist idea of created kinds) and systematic (taxonomic) species.[20] Clearly, the words *genus* and *species*, when translations use them in Genesis 1, are not being used the same way as biologists use them for taxonomic purposes.

Evolutionary philosophy and the obscuring of science

Pennisi's article clearly shows how philosophy can become so entrenched that observational evidence is essentially ignored. She describes the influence of Mayr's views, and how despite knowledge of hybrids formed in zoos, the prevailing opinion among

zoologists was that hybridization rarely occurred in the wild, and when it did, the offspring would certainly be less fit.[21]

There are several probable reasons scientists might assume this. The first is that species are relatively stable, and it would seem hybridization would blur the boundaries more than they are already. As it turns out, hybridization is common between closely related species, but normally only a small percentage of the individuals are involved. Even more interesting, the long-term health of a species can depend on low levels of hybridization, since it brings in variety that may have been lost during times of adverse conditions (e.g. drought).[22] So the ability to hybridize after lineages have diversified appears to be part of God's provision so his creatures could survive and thrive on the earth He created for them (figure 1).[23]

A second reason a scientist might assume that hybridization is rare or harmful in the wild is related to evolutionary philosophy. Darwin pictured life as a branching 'tree'. If hybridization occurs to any significant extent, you will have branches fusing back together. Without the relatively rapid appearance of reproductive incompatibility, explaining the morphologic chasm at higher taxonomic levels becomes more problematic; there should be a plethora of intermediates. Further, some of these species are said to be separated by millions of years, and it would be surprising that reproductive compatibility could be retained for so long as species diverge.

Conclusions

There are several important conclusions we can draw from this. The first is to recognize that species fixity (in the taxonomic sense) was *not* the view expressed by eminent creation field biologists of the past, despite the fact that Darwin sets it up as the view he is opposing. Christians should not be lulled into thinking we should cling to Darwin's strawman, since species fixity is not supported by observational science. The word *species*, as used in biology, is a man-made classification, and difficult to define. In reality, it is the biblical worldview that helps explain why scientists struggle so much to define what is meant by a species, and why so many species concepts have been developed to classify ambiguous populations.

The first chapter of Genesis tells us that God created various kinds of plants and animals to reproduce and fill the earth, and so they have. Today different populations that descended from the same created kind differ from each other enough that they should logically have their own names (e.g. Arctic fox, red fox, grey fox, bat-eared fox). Clearly, if they are distinct enough for their own common name, we will also give them a unique scientific name. Yet, we know based on hybridization that foxes, wolves and coyotes (i.e. all species in the taxonomic family Canidae) are descendants from one created kind.[24]

Given the fact that we see this pattern of diversity today, and that it must have arisen within a few thousand years from a limited number of ancestors (two for most animals on the Ark), it should be clear that God designed his creatures with this ability to diversify, as Wasmann pointed out more than a century ago. This implies that the species we see today are not static; they can still change on timescales we can observe if conditions are right.[25] This means there will *always* be ambiguity in our understanding of species, since it is not a created division. Taxonomically defined species are not equivalent to the kinds mentioned in the Bible, and it is unrealistic to expect them to be constant as we would expect kinds to be.

Another conclusion we can draw is that much of the excellent work of creation field biologists in the past was ignored as evolutionary philosophy took hold of Western culture. This danger, of powerful narratives obscuring reality, should be a warning to us all. We should be able to question why we believe what we believe. We should investigate empirical evidence looking for patterns, and noticing if it supports or contradicts our beliefs. We need Christian young people to rise to the challenge of exploring biology from a biblical perspective to enable us to better understand how God designed His creatures to diversify and adapt so they could fill the earth (Isaiah 45:18).

References

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5. Herbert, ref. 4, p. 337.
6. Herbert, ref. 4, pp. 337–346.
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8. Pennisi, ref. 1, p. 818.
9. Tobias, J.A., Seddon, N., Spottiswoode, C.N., Pilgrim, J.D., Fishpool, L.D.C., and Collar, N.J., Quantitative criteria for species delimitation, *Ibis* **152**(4):724–746, 2010.
10. Herbert, ref. 4, pp. 337, 340–341.
11. E.g. the Latin Vulgate uses *genus* in Genesis 1:11, 21 and 24; Greek and Romance language translations, such as the Spanish Reina-Valera (1960), tend to follow this pattern.
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14. Wasmann, ref. 13, esp. summaries on pp. 342–343, 426–427.

15. Wasmann, ref. 13, p. 328.
16. Wasmann, ref. 13, p. 324.
17. Wasmann, ref. 13, e.g., pp. 339, 347, 376–377.
18. The Vulgate alternates using the word *genus* and *species* in Genesis 1. The Spanish Reina-Valera (1995) and Nueva Version International use *especie*.
19. Linneaus seems to have used terms inconsistently, sometimes in a general sense, and other times as a discrete taxonomic category. See the quotes listed at http://scienceblogs.com/evolvingthoughts/2007/05/22/linnaeus-on-species-1/, accessed 5 December 2017.
20. Wasmann, ref. 13, p. 296.
21. Pennisi, ref. 1, p. 819. It is interesting to note that eminent evolutionary mammalogist Richard Van Gelder (1928–1994), who attempted to reclassify different mammalian genera into the same genus when it was documented that hybrids had formed between them, regardless of the fertility of the offspring (much like Herbert suggested with plants centuries earlier), still held to this view despite having catalogued numerous mammalian hybrids from the literature. Van Gelder, R.G., Mammalian hybrids and generic limits, *American Museum Novitates* **2635**:1–25, 1977.
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23. This topic is reviewed in more detail in Lightner, J.K., Towards a creationary view of why speciation occurs, *J. Creation* **30**(1):70–75, 2016.
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25. This has been observed in finches, where hybrids went on to develop a new species that fits a specific ecological niche. So what Linneaus had observed in plants, evolutionists have now seen in animals; Lamichhaney, S., Han, F., Webster, M.T., Andersson, L., Grant, B.R., and Grant, P.R., Rapid hybrid speciation in Darwin's finches, *Science*, Nov. 2017 | 10.1126/science.aao4593. This rapid origin of a new species was not predicted by evolutionists and is more consistent with the biblical history and timeframe.