

All but a tiny percentage of scientists accept that evolution by natural selection is an established scientific theory. We accept evolution not because of some professional creed or inducement, but instead because of the overwhelming evidence. That evidence ranges from molecular data and comparative anatomy to fossils and biogeography. Nevertheless, instruction about evolution “has been absent, cursory, or fraught with misinformation” (Rutledge & Mitchell, 2002), and fewer than 30% of biology teachers consistently show that evolution has occurred and design their courses to show that evolution is a unifying theme in biology (Berkman & Plutzer, 2010). In socially conservative school districts, nearly 40% of biology teachers

do not accept human evolution (Berkman & Plutzer, 2011). Despite decades of science education reform, many biology teachers continue to ignore, question, or reject evolution in favor of creationism as the best explanation for life’s diversity.

There is “a pervasive reluctance of teachers to forthrightly explain evolutionary biology” (Berkman & Plutzer, 2011). Biologists have responded to this problem in many ways, the most popular of which is to provide educational opportunities and resources for biology teachers to effectively teach evolution. Countless workshops, books, videos, websites, and other materials are readily available to help biology teachers do a better job of presenting evolution, such as by

emphasizing evolution throughout their courses (instead of only in the “evolution unit”) and showcasing the practical applications of evolution (e.g., the evolution of disease resistance). These presumed remedies are based on the belief that we can “convert” the biology teachers who reject evolution if we merely expose them to the evidence for evolution (e.g., in textbooks, summer workshops, supplemental materials). After all, we were convinced by the evidence; won’t everyone else – and *especially* biology teachers – be similarly convinced if they just see the evidence?

No, they won’t.

The many biology teachers who teach creationism have seen the evidence for evolution;

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it is in the textbooks that they use in their current courses. Moreover, these teachers can easily access that evidence in libraries, the Internet, journals, professional organizations, and elsewhere. Nevertheless, they continue to reject evolution in favor of creationism in their classes. Why?

These teachers believe that their arbitrary religious beliefs, and not evidence, best explain life's diversity. In this sense, these teachers mimic the public; for example, when asked what they would do if scientists were to disprove a particular religious belief, 64% of respondents in a 2006 *Time* magazine survey said that they would continue to accept their religious beliefs rather than accept the contrary findings of science (Masci, 2007). Many biology teachers do the same thing. These teachers' religious beliefs are more influential on their acceptance of evolution than either their understanding of the nature of science or their understanding of evolution (see discussion in Trani, 2004). Why else would these teachers include creationism – a religious rather than scientific view – in their biology classes? Why else would one-sixth of biology

teachers believe that Earth is only about 6000 years old (Berkman et al., 2008)? This nonsensical religious claim – a belief comparable to claiming that infectious disease is caused by demons – has long been rejected by geologists, physicists, and other scientists, and is endorsed only by those whose religious beliefs take priority over logic and evidence. Again these teachers mimic the public; for example, a Gallup poll in 2007 reported that only 14% of those who reject evolution cite a lack of evidence as the main reason underpinning their views. More cite their belief in God (16%), Jesus (19%), or general religion (16%) as their reason for rejecting Darwin's theory (Masci, 2007). This helps to explain why teachers with strong religious convictions accept the theory of evolution less often than their less religiously convicted peers (Trani, 2004).

When biology teachers teach creationism, they usually present only the Christian version of creation, and this story is presented as a scientific alternative to evolution (Moore, 2008). Other religions' stories of creation are ignored and, by implication, deemed unworthy of consideration. Despite

the unconstitutionality of this promotion of religion, there are – with few exceptions (Moore, 2004) – no consequences when biology teachers promote creationism in their classes. Rather than being held accountable to professional standards, colleagues and administrators usually ignore (or even encourage) these teachers. If teachers made comparably nonsensical claims about other well-established findings of science – for example, by teaching that human babies are delivered by storks or that someone can be cured of cancer by rubbing beads together – they would be deemed grossly ignorant or senile, and declared unworthy and incompetent to be in a science classroom. But the teaching of creationism continues to be tolerated, and sometimes even encouraged.

We waste our time if we try to convince creationism-proclaiming biology teachers of the validity of evolution. These teachers have not been convinced by decades of science education reform, emphases on critical thinking, court decisions, professional organizations' endorsements of evolution, professional organizations' rejection of creationism, and

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state education standards, and these teachers are convinced that their religious beliefs are more important than professional competence or the constitutional rights of their students. They will not objectively consider the evidence, nor will they stop replacing science with the claims of their particular religion. It's a shame that these teachers' religion demands ignorance, and even more shameful that they force that ignorance on their students.

## References

- Berkman, M.B., Pacheco, J.S. & Plutzer, E. (2008). Evolution and creationism in America's classrooms: a national portrait. *PLoS Biology*, 6(5), e124.
- Berkman, M.[B.] & Plutzer, E. (2010). *Evolution, Creationism, and the Battle to Control*

*America's Classrooms*. Cambridge, MA: Cambridge University Press.

- Berkman, M.B. & Plutzer, E. (2011). Defeating creationism in the courtroom, but not in the classroom. *Science*, 331, 404–405.
- Masci, D. (2007). How the public resolves conflicts between faith and science. [Online.] Available at <http://www.pewforum.org/Science-and-Bioethics/How-the-Public-Resolves-Conflicts-Between-Faith-and-Science.aspx>.
- Moore, R. (2002). *Evolution in the Courtroom: A Reference Guide*. Santa Barbara, CA: ABC-CLIO.
- Moore, R. (2004). Standing up for our profession: a talk with Ken Hubert. *American Biology Teacher*, 66, 325–327.
- Moore, R. (2008). Creationism in the biology classroom: what do teachers teach & how do they teach it? *American Biology Teacher*, 70, 79–84.

Rutledge, M.L. & Mitchell, M.A. (2002). High school biology teachers' knowledge structure, acceptance, and teaching of evolution. *American Biology Teacher*, 64, 21–28.

Trani, R. (2004). I won't teach evolution; it's against my religion. And now for the rest of the story.... *American Biology Teacher*, 66, 419–427.

RANDY MOORE is H.T. Morse-Alumni Distinguished Teaching Professor of Biology at the University of Minnesota. He edited *The American Biology Teacher* for 20 years and is author of *More Than Darwin, Arguing for Evolution, Chronology of the Evolution-Creationism Controversy*, and the upcoming *Understanding Galápagos: What You'll See and What It Means*. E-mail: [rmoore@umn.edu](mailto:rmoore@umn.edu).

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