

Traveling to the Idaho Golf Course Superintendents Association meeting in Salmon, Idaho, last month was enjoyable because of the attendees and scenery, as well as the time I

spent with David Kopec, Ph.D., from the University of Arizona. The three-hour journey from Missoula, Mont., to Salmon followed a portion of the trail traversed by Lewis and Clark.

The beautiful but sometimes smokey trip, thanks to a forest fire burning close by, provided a picturesque backdrop for our nonsensical conversation. For a brief moment, our discussion became more circumspect.

The question was raised: “What would you consider to be the most significant piece of published research that has contributed to a better understanding of turf in the past 10 or 20 years?”

We agreed on the paper “Instability of the Greens-Type Phenotype in *Poa annua* L.” by Jonathan M. La Mantia and David R. Huff of Penn State University, published in *Crop Science* in 2011.

Now, everyone has biases when faced with such a question, and the assumption is made we keep up with current literature. Additionally, Dr. Kopec and I don’t always agree, so to come to an agreement, we focused on something we both have spent our careers trying to kill or manage, *Poa annua*.

I haven’t documented the number, but it would be reasonable to think that since the first golf ball was struck at St. Andrews, the most discussed and written agronomic topic is *Poa annua*.

Regardless of what continent you’re on — and *Poa annua* has been found on all seven of them — you’ve faced the decision to control or manage it.

But there’s one question that has never been thoroughly explained, and that is: How does *Poa annua* evolve from an annual type that initially invades a creeping bentgrass putting green to one that exhibits perennial type characteristics?

The reason for the rise in perennial types has been speculated on for decades. Environmental

The Evolution of *Poa Annua*

BY KARL DANNEBERGER



“HOW DOES *POA ANNUA* EVOLVE FROM AN ANNUAL TYPE THAT INITIALLY INVADES A CREEPING BENTGRASS PUTTING GREEN TO ONE THAT EXHIBITS PERENNIAL TYPE CHARACTERISTICS?”

causes and cultural practices are believed to be the primary reasons for the change from annual to perennial biotypes.

To better understand the perennial nature of *Poa annua* on greens, La Mantia and Huff characterized the annual and perennial type of phenotypes in their *Poa* collection. Focusing on inflorescence differences, they found that the subsequent progeny didn’t follow expected Mendelian ratios that would be expected with single gene characteristics when crossing green type by annual type.

Furthermore, when green types by green type *Poa annua* crosses were conducted, subsequent generations past the first generation resulted in annual type of *Poa annua* progeny.

Thus, the green type or perennial *Poa annua* is unstable, meaning the perennial type of *Poa annua* found on greens will revert back to annual types. The authors hypothesized that that’s because close mowing induces an epigenetic effect on gene regulation.

This means that the functionality of the DNA might be affected (in this case by mowing), resulting in perennial biotypes. However, the underlying DNA, or the genetics, isn’t changed. As long as the mowing stress is present, *Poa annua* on greens will tend to exhibit the perennial traits. But once mowing is removed, it eventually reverts to an annual.

It’s fascinating stuff.

Entering the town of Salmon, we began to discuss other important research. But our attention shifted to a yellow 1963 Dodge Power Wagon that was for sale along the road.

I guess discussing research will have to wait for a future road trip.

Karl Danneberger, Ph.D., is Golfdom’s science editor and a professor at The Ohio State University.