

## One Result, Many Causes

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Winterkill begets winterkill at many older golf courses across the upper Midwest that have playing surfaces dominated by *Poa annua*. Courses with greens affected by severe winter injury, typically seed creeping bentgrass into the thin and bare areas. However, the end result is usually an even higher percentage of *Poa* due to minimal bentgrass seedling survival on a green that is kept open to play and aggressively maintained at low heights of cut during recovery. Many of the new *Poa* plants that germinate from seed already in the greens will likely have less ability to tolerate winter stress versus the older *Poa* plants they replaced. Consequently, a vicious cycle of winter injury can occur.

Why isn't there more research about winter injury? This question was raised more than once by superintendents at turf conferences I have recently attended. In fact, there is ongoing research about winterkill available if you know where to look. For example, within the past five years there have been extensive studies undertaken in Canada about impermeable covers and methods for removing ice cover from putting greens. A website that shows a summary of various winter injury experiments conducted at the Prairie Turfgrass Research Centre at Olds College in Alberta, Canada is [http://ptrc.oldscollege.ca/summaries\\_plantstress.html](http://ptrc.oldscollege.ca/summaries_plantstress.html).

Could there be more winter injury research? Of course, but winter stress is a regional problem and research funds for problems that only affect a relatively small percentage of golf courses are limited. Furthermore, the environmental conditions that cause winter injury are not completely understood and are difficult to reproduce under field conditions. Many well-designed field experiments regarding ice damage research failed to bear fruit because of an unusually

warm winter.

To complicate matters further, there are several forms of winter injury that all produce the same result – dead turf. A single green could experience both wind desiccation across elevated, exposed areas and crown hydration across low, poorly drained pockets of turf during the same winter. Low areas could be affected by ice suffocation or thaw/freeze injury or a one-two punch of both conditions.

Slowly, but surely, research is unraveling the mysteries of winterkill, though we are often still perplexed why one green sustains extensive damage and another nearby putting surface under similar conditions survives the winter unscathed. No doubt, it's a challenge to determine what killed the turf when it's just about impossible to determine exactly when it died during the winter.

Still, there are a few "knowns" among the "unknowns." We know that bentgrass tolerates stress from ice and cold temperatures much better than *Poa annua*. Classic ice injury research at Michigan State University was conducted by Dr. James B. Beard during 1964-1965. A number of other studies since then support the observations regarding the superior winter hardiness of bentgrass versus *Poa*.

If you have been affected by winter injury on greens more often than not during the past decade, maybe it's time to change your grass instead of your fall/winter management practices. Susceptibility of *Poa annua* to winterkill has been one of the major factors why a number of courses across the upper Midwest have decided to rebuild or re-grass putting greens during the past ten years.

A USGA Turf Advisory Service (TAS) visit can definitely help you determine what options are available for old putting greens if you are losing the battle with *Poa annua*. The modest cost of a half or full-day consultation pales in comparison to the lost revenues from dues or green fees associated with lengthy spring recoveries from dead or damaged putting greens that occur year after year.



**Winterkill one season may lead to increased risk of winterkill for the next winter.**