Super Science

//**POA AND PUTTING GREENS**

AN INTEGRATED NUTRITIONAL AND CHEMICAL APPROACH TO *POA ANNUA* CONTROL IN CREEPING BENTGRASS PUTTING GREENS

By Nathaniel F. Reams, Xunzhong Zhang, Ph.D. and Erik Ervin Ph.D.

Poa annua suppression and control in creeping bentgrass putting greens is a perennial challenge in many temperate climates. A nutritional approach to *Poa annua* control is frequent use of sulfates of iron and ammonium to provide plant nutrition plus gradual rootzone acidification. Also common is the repeated application of paclobutrazol to selectively injure *Poa annua* throughout the growing season.

The ultimate goal is a smooth transition to mostly creeping bentgrass, without sudden stand collapse. Our objective was to apply very high foliar rates of $FeSO_4$, in combination or not with paclobutrazol or seaweed extract, and determine effects on *Poa annua* populations in a creeping bentgrass putting green over time.

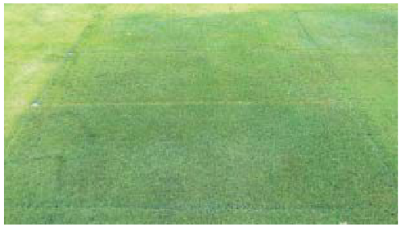


Image of the 2.0x rate $FeSO_4$ plots in early May 2013, at the beginning of Year 3 of the trial. The darkest and most *Poa*-free plot (foreground) was also treated with paclobutrazol. The middle plot also received seaweed extract, while the background plot is $FeSO_4$ alone.

The trial is on a mature sand-based putting green, originally seeded with Penneagle creeping bentgrass but now consists of 50 to 65 percent *Poa annua*. Main plots were foliar $FeSO_4$ rates of 0, 0.25, 0.50, and 1.0 lbs. per 1,000 sq. ft. (0, 0.5x, 1.0x and 2.0x rates, respectively) applied every two weeks from March through October. Main plots are split by seaweed extract (4.0 oz. per 1,000 sq. ft.) or paclobutrazol (22.3 percent a.i. at 0.50 oz.) (spring and fall) and 0.25 oz. (summer) per 1,000 sq. ft. on the same application schedule. Nitrogen was supplied to all plots uniformly via ammonium sulfate at 1.8 lbs. N per 1,000 sq. ft. per year. Initial soil pH at 1.0 inch was 6.22. $FeSO_4$ treatments had no effect on soil pH at the end of Year 1. The 1x and 2x $FeSO_4$ rates reduced *Poa annua* to 11 percent and 9 percent, respectively, by the beginning of Year 2, but seaweed extract had no effect. Adding paclobutrazol to the 1x and 2x $FeSO_4$ rates decreased *Poa annua* from 20 percent (paclobutrazol-alone) to between 3 and 5 percent. Preliminary results indicate that season-long application of high rates of foliar $FeSO_4$ have the potential to significantly reduce *Poa annua* in CB putting greens.

Nathaniel F. Reams, Xunzhong Zhang, Ph.D., and Erik Ervin Ph.D., Virginia Tech University. Reams can be reached at nreams@vt.edu.

PHOTO BY: ERIK ERVIN, PH.D.

NEWS UPDATES

UMD'S DERNOEDEN RETIRES

After 33 years at the University of Maryland, Peter Dernoeden, Ph.D., is retiring on June 30.

Though the professor taught a class on pest management strategies for turfgrass, he primarily was responsible for extension activities and research centering on weed and disease control and pest management strategies.

"It's bittersweet," Dernoeden said of retiring after three decades at the school. "I will miss university life (but not the committee and faculty meetings) and the fulfillment that comes with working with dedicated students and turfgrass professionals."

His best memories, he said, center on mentoring graduate students, the friendships he made and the opportunities he had to travel and interact with other turf professionals.

"PROPER ESTABLISHMENT IS THE SINGLE LARGEST FACTOR IMPACTING LONG-TERM SUCCESS OR FAILURE OF A BUFFALOGRASS STAND."

Keenan Amundsen, Ph.D.
(see full story on page 42)

//DROUGHT TOLERANCE

Buffalograss can stand the heat... and drought

By Keenan Amundsen, Ph.D.

Drought, regulatory restrictions, limited resources, implementation of conscientious efforts to save water, and the appeal of reduced irrigation costs are some of the factors driving the turfgrass industry toward reduced irrigation input. The use of species that have improved water use efficiency, and drought tolerance, or that require less water for normal growth and function than traditional turfgrasses, is a viable choice for superintendents wanting to conserve water. Turfgrass species such as buffalograss that are naturally adapted to and actually thrive in arid environments have a competitive advantage when grown with less water compared to many traditional species from more temperate and humid regions.

USGA Turfgrass and Environmental Research

Buffalograss is found naturally growing throughout the Great Plains region of North America. It is a warm-season, perennial, stoloniferous species that forms a dense sod and has a dark green color and fine leaf texture. The turfgrass breeding program at the University of Nebraska has focused on developing improved turf-type buffalograss cultivars since entering into a partnership with the United States Golf Association in the mid-1980s. Over the past several decades, the research focus was to improve low-mowing tolerance, enhance wear tolerance, increase canopy density, accelerate establishment rate and develop management practices for optimal buffalograss performance. This research has led to the development of several commercially available turf-type seeded and vegetative buffalograss cultivars.

Two of the best attributes of buffalograss relative to water conservation are low temperature and drought tolerance. Buffalograss is a warm season species that can be found naturally occurring in turf stands extending northward into Canada. Buffalograss has a strong winter dormancy response, which helps it survive seasonal low temperatures in northern climates. Once dormant, most buffalograss varieties exhibit a straw

FIGURE 1

Buffalograss experimental lines growing near Mead, Neb., evaluated for late-fall color retention. This image was taken on October 29th, 2012.

"A common misconception of buffalograss is that it is a 'no maintenance' species. This concept often creates problems during establishment."

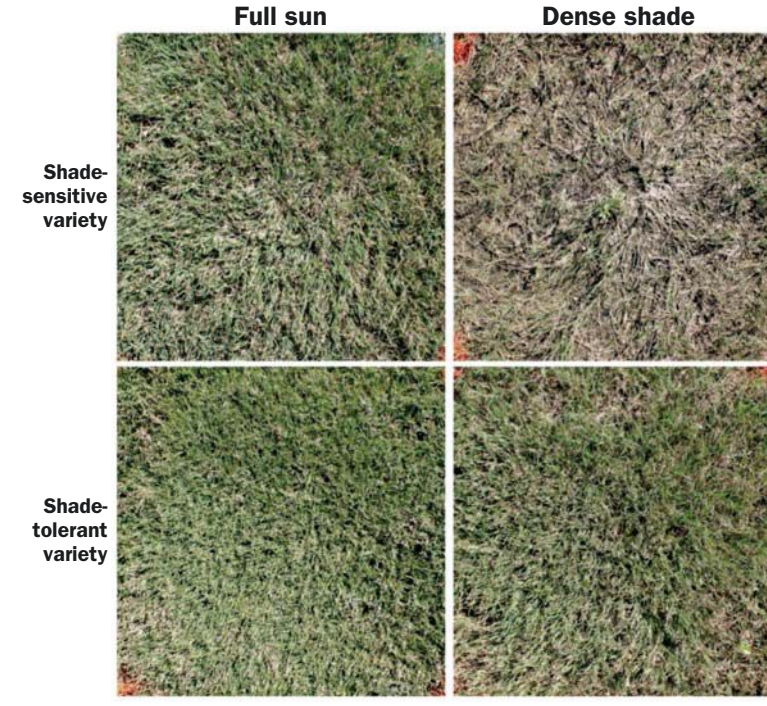
color appearance, often considered a drawback of the species.

The breeding program at the University of Nebraska is focused on identifying and breeding for buffalograss lines with an extended growing season, or that have improved color retention into the dormancy period and are less prone to winter injury (Figure 1). Dormant buffalograss can be an advantage in terms of water use, since it is not actively growing when dormant and needs little moisture. Additionally, actively growing buffalograss has an expansive root system that allows it to use more of the available soil moisture compared to many other turfgrasses, resulting in less supplemental irrigation.

Challenges to more widespread use of buffalograss arise, in part, from limited seed/propagule supply due to increased demand for native turfgrasses throughout the United States, perceived poor establishment concerns and poor shade tolerance. New cultivars are being developed to address each of these issues. For example, buffalograss is often considered to be intolerant of shade. A three-year study was used to successfully identify selections that maintain an acceptable level of performance in the shade (Figure 2). The commercially available vegetative variety, "Prestige," was among the best for shade tolerance. Increased production is being addressed through basic research to overcome mechanisms of seed dormancy, improve seed yield, enhance sod production characteristics and identify sources of resistance to common buffalograss diseases. These traits will help lower end-user costs, increase production and reduce management costs.

A common misconception of buffalograss is that it is a "no maintenance" species. This concept often creates problems during establishment. Proper establishment is the single largest factor impacting long-term success or failure of a buffalograss stand. Like any other turf species, buffalograss seeds, plugs and sod require more intensive management during the establishment period and can be significantly reduced once established.

FIGURE 2



Buffalograss shade-tolerant and shade-sensitive experimental lines grown in full sun and under a shade cloth blocking 60% of the natural light (dense shade). The images were taken following three years of light treatments.

A mature buffalograss stand will survive in areas where it is well adapted with minimal inputs, however a high-quality turf stand can only be achieved if fertility, irrigation, mowing and other cultural practices — including weed control — are applied. When grown in a golf course setting, current buffalograss varieties are most suited to the rough or areas managed at a higher height of cut. A high-quality buffalograss stand can be maintained with as little as 1.5 lbs. N per 1,000 sq. ft. per year and 0.25" of water per week either through rain or supplemental irrigation per growing season. Most buffalograss cultivars have an optimal mowing height of 2 to 3 inches, but low mowing-tolerant varieties can be maintained at 1 inch. Additionally, buffalograss can be left unmown to achieve a native prairie look.

Buffalograss offers color, texture and other differences relative to many other turfgrass species. When grown adjacent to cool-season grasses, buffalograss offers a contrast during the late spring and early fall, when both species are actively growing; during the heat of the summer, when buffalograss thrives; or in the late fall/early spring, when cool-season species are actively growing (Figure 3). With a well-planned design, buffalograss could be incorporated as an architectural feature of a course, offering a target for strategic shot placement while adding to the overall aesthetics of the course.

The current and projected turf management perspective for the game

Continued on page 44

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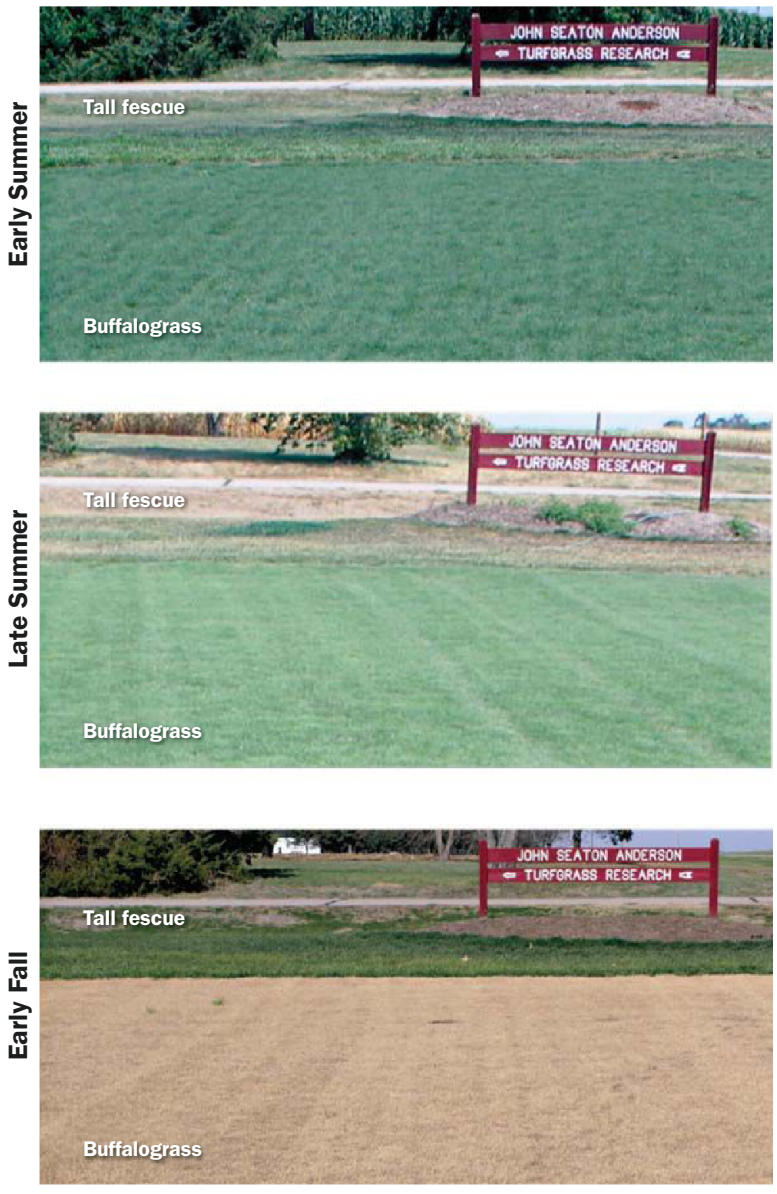
of golf is well aligned with the use of a grass species that favorably responds to reduced inputs. Buffalograss offers the superintendent a viable option for sustainable management practices, greatly improved resource conservation and aesthetic appeal and playability.

Acknowledgment

I would like to thank the United States Golf Association for providing financial support for this project.

Keenan Amundsen is an assistant professor of turfgrass breeding at the University of Nebraska-Lincoln. Keenan can be reached at kamundsen2@unl.edu.

FIGURE 3



Seasonal comparison of adjacent buffalograss and tall fescue turf stands growing near Mead, Neb.

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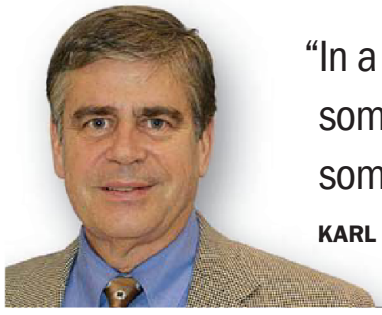


"In a world of constant change, sometimes it is nice to know some things don't change."

KARL DANNEBERGER, PH.D., *Science Editor*

Changing of the guard

I shall adopt new views as fast as they shall appear to be true views.
– Abraham Lincoln

June at The Ohio State University and many other universities represents the end of the fiscal year.

It's also a time when retiring faculty officially bid adieu to the university. It's both an exciting and sad time. You're happy for your outgoing colleagues as they start a new "career," but at the same time, they will be missed. Many faculty — not only here at OSU but around the country — are retiring or will within the next few years. It is estimated in my college, the College of Food, Agriculture and Environmental Sciences, that 30 to 50 percent of our faculty could potentially retire in the next three to five years.

Most of the faculty who have retired recently or plan on retiring either served in, were educated during, or grew up during the Vietnam War. The current Vietnam War generation replaced the faculty from the World War II generation in the late 1970s and early 1980s. Now we are being replaced by a new generation, one I hope is not described by some war.

I believe any change — whether good or bad — presents opportunities. Younger generations especially seem to embrace change. And with every retiring professor comes an opportunity for the next generation to take the stage. Dr. Bill Daniel, a turfgrass professor at Purdue University, seemed to acknowledge this when he retired in the early 1980s. He loved working at the university and interacting with students and people in the turfgrass industry, and I remember asking him why he was retiring. He replied, "It's time to give someone else a shot." I think he viewed change positively, and who better to adapt to change than someone young in the profession?

Make no mistake, universities are facing significant challenges, from fiscal issues to meeting future needs in research and education. Although universities are facing constant change and challenges, the core —teaching, outreach and research — remains. We may alter how we teach and the type of research we do, but why we do what we do remains constant.

The core of what universities are teaching and researching is comforting to many… like church. The virtues associated with a religion are similar to the fervor alumni and students feel for their university. And for many of them, the school serves as a personal anchor long after graduation. I probably say it too much, but in a world of constant change, sometimes it is nice to know some things don't change.

This month, after 33 years as a faculty member, Dr. Peter Dernoeden, professor of turfgrass science at the University of Maryland, retires. He taught a class in pest management strategies for turfgrass, published more than 100 scientific journal articles and advised a number of graduate and undergraduate students who have gone on to successful careers in the industry and academia. Given that Peter primarily worked as an extension specialist, his impressive research and teaching accomplishments are that much more remarkable.

Dr. Dernoeden, and I say this with the utmost respect, is what we would call an "old time" extension specialist. He ran the University of Maryland Turfgrass Plant Disease Diagnostic Laboratory, coordinated the Maryland Research Field Day and conducted countless studies on turfgrass pest control to complement his extension activities.

What made him unique in today's world of technology and budget cuts was his face-to-face, one-on-one extension visits to golf courses. Peter helped numerous golf course superintendents throughout the mid-Atlantic region during stressful summers by problem solving, providing unbiased, no-nonsense recommendations, and most of all, listening to superintendents. The result from Peter's doing this year after year? He had one of the largest and most loyal followings among superintendents out there.

Very few can achieve all that Peter has, but in a world of constant change, he is the perfect model for a new generation of turfgrass faculty.

Karl Danneberger, Ph.D., *Golfdom*'s science editor and a professor at The Ohio State University, can be reached at danneberger.1@osu.edu.

Managing ants on putting greens

Dan Potter, Ph.D., is a professor of entomology at the University of Kentucky. He has conducted research on numerous turfgrass-damaging insects and beneficial insects. He can be reached at dapotter@uky.edu.

Q Are ants on putting greens becoming more of a problem?

There seems to be an upsurge in ant problems on putting greens, which I attribute to the change in insecticides that are applied on and around greens today. Modern insecticides are more target specific than products such as chlordane and diazinon, which were used many years ago.

Those older insecticides not only controlled targeted pests such as cutworms, they also controlled ants and many types of beneficial insects. Neonicotinoids and Acelepyrn (chlorantraniliprole) have relatively little or no activity on ants.

Q Before we talk about controlling ants on greens, is there anything positive about them?

Yes, ants are highly beneficial in a turfgrass ecosystem. They are aggressive predators of eggs of many insect species, including those that damage turfgrass. Only control ants where absolutely necessary. Let them work to suppress insect pests on the rest of the golf course.

Q What is the basic life cycle of the turfgrass ant (*Lasius* neoniger) found on most greens?

New colonies originate when swarms of winged reproductive ants emerge from existing colonies and take to the air in late summer. After mating, the new queens shed their wings and burrow into the soil to establish a new colony.

> "Ants are highly beneficial in a turfgrass ecosystem. Only control them where absolutely necessary. Let them work to suppress insect pests on the rest of the golf course."

Mated queens prefer areas in full sun that keep the colony warm. They start laying eggs in late winter. The colony grows rapidly in late spring and early summer as the ants enlarge their nest and foraging area and increasingly more workers are reared. The number of mounds varies from a few to dozens per colony and increases from early spring to mid-summer.

Production of males and new queens in late summer completes the cycle. Once a nest has been established, the resident queen may survive and lay eggs for several years.

Control ants the first time you see mounds on the green, usually in March and April in the Midwest. It is important to control ants when you first see the mounds before the population gets out of hand.

Q Where are ants found on greens?

Our research and observations indicate mounds are found around the edge of the green, usually within six feet of the green perimeter. Mounds start at the edge of the green in the spring and move inward as the season progresses.

The mounds we see on greens are outposts and used for foraging for dead insects found on the perimeter of the green. Mowers do a great job of depositing dead insects along the perimeter of the green. The main nest is outside the collar in natural soil of the surrounds.

Q What strategies do you recommend to control ants on greens?

Control the mounds when you first see them. If you broadcast spray an insecticide, only treat the outer six feet of the green, the collar and a few feet into the surround. We have found spot treating only the mounds as they appear is an excellent way to control ants.

Pyrethroids (e.g., bifenthrin, lambda-cyhalothrin) and combination products that contain a pyrethroid work well to control ants, but be aware the control is only effective for about four weeks. Pyrethroids only knock back the worker ants. It is difficult to control the queen, so over time the colony recovers and the mounds return. Spot-treating with Advion Fire Ant Bait or Maxforce Fine Granule Insect Bait also can be effective.

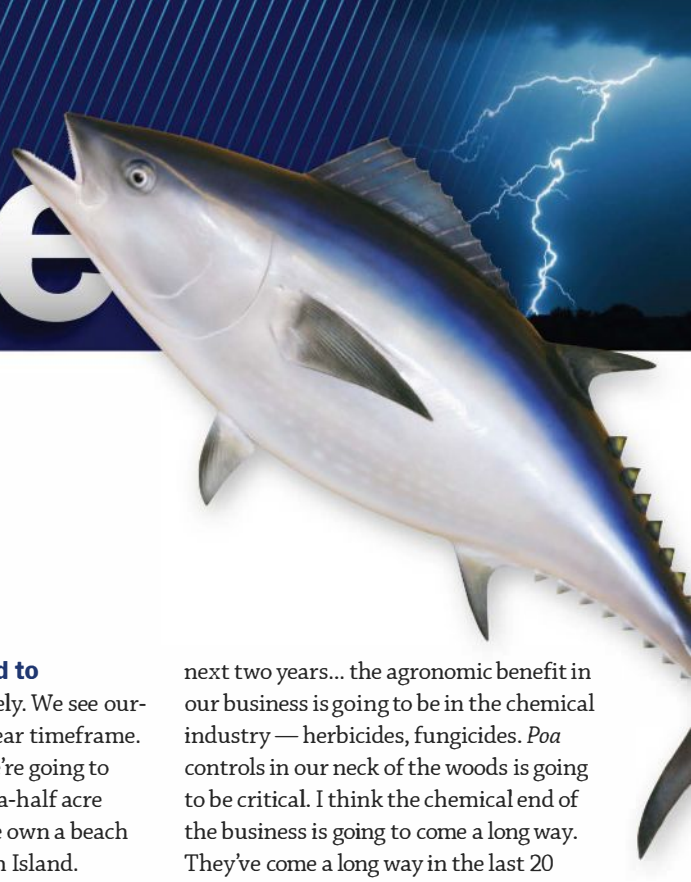
I am not aware of any cultural practices that control ants on greens.

Q Anything else to add?

I am a huge fan of ants. Do not eliminate them. Control them where necessary. They are the primary biocontrol agent for grubs. Ants are our friends.

Clark Throssell, Ph.D., loves to talk turf. Contact him at clarkthrossell@bresnan.net.

The 19th Hole



Jeff Wetterling

CGCS // Greenacres CC, Lawrence Township, N.J.

So what's your drink of choice? Well, a cold beverage of almost any kind will do. An Amstel Light, but if alcohol is not an option, a tall Arnold Palmer.

How long have you been at Greenacres? I've been here for 21 years as superintendent. I left for 15, and I was here prior in high school and college for nine. My wife and I are both Central Jersey, born and bred.

Tell me about your family? My two kids are 34 and 31. They both have two children each, both doing well. For 39 years I've been married. We got married in 1974. That's a long time! Nancy is retired from IBM. She constantly reminds me she's retired!

Are you looking forward to retirement? Oh, absolutely. We see ourselves retiring at the 62-year timeframe. A year and a half to go. We're going to stay put, we have a 5-and-a-half acre parcel on a flag lot, and we own a beach house down in Long Beach Island.

What's the best thing on TV right now? I like *Wicked Tuna*. I'm an avid fisherman. They're off Massachusetts bluefin tuna fishing. Take a look, it's pretty neat, they're catching 300-, 400-pound fish.

What turf maintenance tool has the potential to really grow? You know, I think the thing that is coming in the next two years... the agronomic benefit in our business is going to be in the chemical industry — herbicides, fungicides. *Poa* controls in our neck of the woods is going to be critical. I think the chemical end of the business is going to come a long way. They've come a long way in the last 20 years already — I think back to when we were spraying thiram and PMAS out of a gun, you know?

So I bumped into you this year at Augusta National. How many times have you been to the Masters? I think this was our 18th year. I missed two, just scheduling conflicts, when the kids got married. I always tell people you go to the Masters for three things: the course, the tournament and the people you meet. It's a special place, as you know. It's just a cross section of the golf society.

What's the gossip with the boys in the shop these days? The boys are talking about the amount of clippings on fairways if we don't spray enough Primo out there! That makes the job a lot more difficult. That's the topic of conversation; the grass is growing too damn fast.

What is the wildest weather event you've experienced firsthand? I was about 100 feet from a lightning bolt. This was 30 years ago. It blew a tree apart. It sounded like dynamite, like a bomb, when you're that close. I thought I had great respect for lightning, but boy, I got a lot more that day.

As interviewed by Seth Jones, June 3rd, 2013.

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