



The specific pheromones that trigger bucks to identify and trail receptive does have yet to be identified by science. It's all part of a complex biological equation. *Photo by Ken Archer*

Those of us in the field of biology should continue to ask ourselves a similar question: "What do we really need to know about whitetails?"

## HOW FAR WE'VE COME

I've been blessed to spend four decades studying, hunting and living with whitetails. Along the way, my colleagues and I have been able to make several significant discoveries and contributions to man's knowledge of the species I love so much. It began with the proverbial "low-hanging fruit," meaning information most easily obtained through scientific study.

I'm considered to be a pioneer in this industry, and perhaps that's accurate — but I also was fortunate to come along at a time when we knew relatively little about whitetails. Our earliest research dealt with food plots, and certain aspects of that research continue today. In those days, the few folks who planted anything for deer tended to use oats. These often were seed oats (not winter oats), and they typically were grown with very little fertilizer. Over 20 years later, in conjunction with Dr. Stephen Harrison at LSU we were able to develop a new variety designed specifically for deer forage.

Then came questions about the behavior of mature bucks. Tracking radio-collared bucks in the wild, we monitored movement over several generations. In so doing, we discovered interesting behaviors and patterns of habitat use. We later used helicopters to capture and recapture bucks over a number of years, in an effort to determine how much predictability there is to antler growth in the wild. Studies such as these have made it quite rewarding to spend a career working with whitetails.

## WHAT LIES AHEAD?

Of course, it's one thing to reflect on what you feel you've helped achieve

# WE NEED TO KNOW

I was at a hunting show years ago, presenting a talk on hunting the various stages of the rut.

**BY DR. JAMES C. KROLL**

The seminar room was between the show entrance and main hall.

Per usual, at the end of my talk I asked if there were any questions. A

fellow held up his hand asked one of the few questions I'd never heard:

"What do we need?"

Puzzled, I asked for clarification. "What I mean is, we're about to go into a hall full of booths with folks who want to sell us something," he said. "But what do we really need?"

**ABOUT THE AUTHOR** ▶ Dr. Kroll is founder and director of the Institute for White-tailed Deer Management & Research in Nacogdoches, Texas.

— quite another to look ahead at unfinished business. And for all we've figured out about whitetails during my time in the field, many unanswered questions remain.

The first that comes to mind for me is likely one of those intriguing you, too: namely, factors influencing the timing of rutting activity. We've learned the physiology behind how deer monitor day length, as well as some

other factors that affect rut timing. Yet I've noticed there are years in which the timing makes no logical sense. To add to the puzzle, when the rut is strange for free-ranging deer, it's also that way for deer breeders spread over a broad geographic area. Neither I nor any other deer scientist has managed to figure out why this is.

Whitetail behavior in general still is filled with mysteries. One that truly

fascinates me is an old question: "Do deer really have a sixth sense?" We've all been in situations in which a buck should have walked right into shot range but suddenly appeared to change his mind. Did he have some "telepathic" sense of danger? Did some physical cue unknown to us tip him off? Or did he just guess right? We really don't know the answer.

Another key question relates to deer vision. Scientific studies have shown which colors and spectra the whitetail eye can perceive — but have we really identified them all?

My wife, Susie, has picked at me for years with her "aura" theory. She claims we all have an aura that surrounds us — and that deer can see it! To show how strongly Susie believes this, she always tries to think "happy" thoughts so a buck she's watching won't perceive a bad aura!

As a hardcore scientist dealing only in documented facts, I have a hard time buying her idea. Yet you now can buy hunting apparel designed to absorb the electromagnetic waves emanating from our bodies. Is this the same as an aura? The manufacturer even has asked me to study whether or not the product works, but I have yet to be able to design a scientifically valid experiment to test it without bias. We do plan to launch the study over the next year.

Great progress has been made in determining the nutritional needs of whitetails. Even so, there still are some nagging questions. For example, while we developed the first scientifically formulated mineral and deer feed, we still don't have an adequate measure of how mineral supplementation benefits a deer herd. I still put out mineral faithfully, but neither I nor any other scientist has been able to quantify the benefits.

We know nutritional demands aren't the same for bucks, does and fawns. We also know nutritional needs change over time for all deer. But deer don't process all of their foods in exactly the same way. We know very little about which plants and feed components can benefit deer in this way.

On a related note, ask the average agency biologist about feeding deer,

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and you probably will get a stern lecture about the evils of such activities. It's generally thought feeding spreads and encourages diseases, based solely on confined-exposure studies. Well, there's a difference between supplemental feeding and baiting. I'm inclined to agree that feeding deer just to have more of them probably isn't a good idea, but supplemental feeding might well have a place in management.

What we don't yet know is whether or not nutritional supplementation, properly done, improves the health and distribution of deer on the landscape. Most diseases are density-dependent, meaning that the more bodies you pack into a unit of space, the more likely disease is to spread. We also know healthy individuals are less likely to contract a disease, especially if stress is due to lack of nutrition and crowding. We simply don't yet know if specific aspects of nutrition can help us protect deer against certain problems.

Furthermore, we've only recently begun work to determine if feed can be used as a vehicle to deliver vaccines when a disease occurs. There's been some progress with tuberculosis vaccines, and there's even talk of a chronic wasting disease (CWD) vaccine. If these are proven to be efficacious, there will have to be a delivery vehicle, and that would be a feed of some type.

Of course, some professionals would prefer lower deer populations. Some also are philosophically opposed to artificial feeding. This gets into the realm of philosophy and not science, so I'll withdraw from that game.

Following up on these thoughts, what do we still not know about CWD? For that matter, what do we *need* to know? First of all, after spending over \$1 billion in research and eradication efforts, we haven't been able to eliminate it. We've learned a lot about the infective agents (prions) causing the disease, but we still don't know how these mutated proteins came to be. Nor do we know how they can appear spontaneously.

Research has focused more on proving it's a serious disease and computer modeling to try to show it eventually will cause deer and elk to become extinct. Yet over the last four

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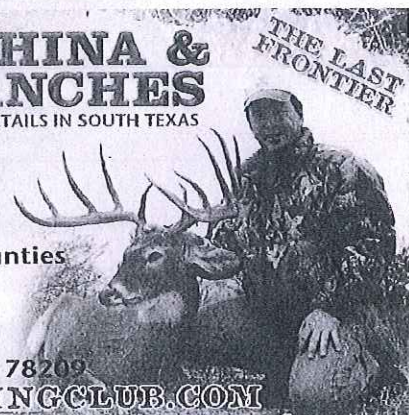
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decades, there's no scientifically valid evidence that CWD has had a negative impact on any such population.

As to what we still need to learn about CWD, it primarily relates to managing the disease, not *eradicating* it. We now have promising research that has identified at least one resistant gene for CWD, but emphasis continues to be on eradication, not management.

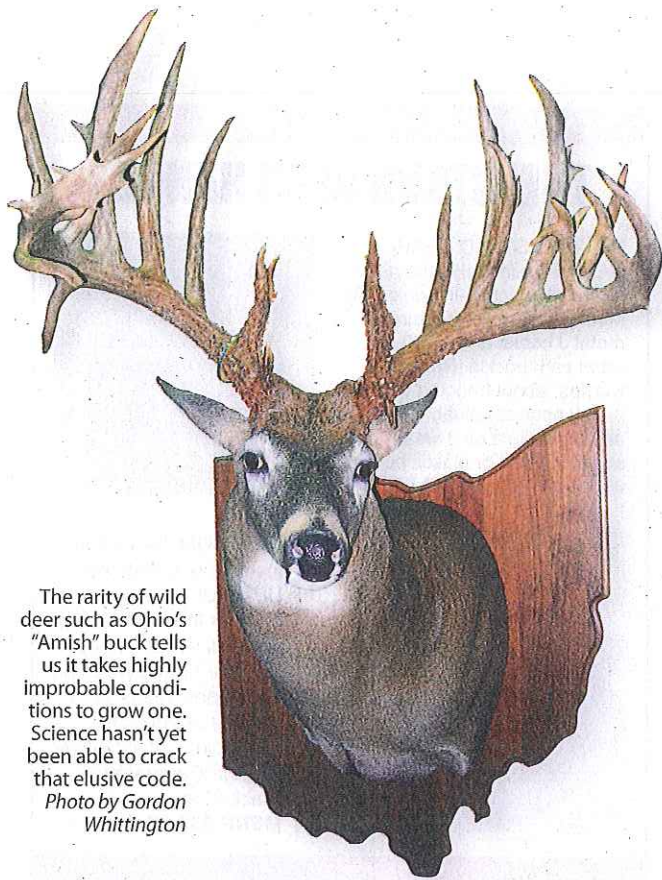
Deer breeders have contributed a lot to our knowledge base about whitetails, especially in regard to the roles of nutrition and genetics in producing large antlers. The extremely large racks now being produced by deer breeders bring support to the idea that the free-ranging monster bucks in the pages of this magazine are even more special than we ever thought!

Deer breeders used the technique of line breeding (mating of full brothers and sisters or a parent to its offspring) to artificially produce such bucks. We've learned the dam (mother) is just as important to the genetic antler equation as is the sire (father) — if not more so. I feel there's no such thing as the "antler" gene. Rather, a number of sex-linked genes affect antler size. Genes controlling nutritional efficiency, milk conversion and even "personality" likely will be identified in the future.

In the wild, a world-class rack likely results from one of these scenarios: (a) a buck carrying genes for large antlers by happenstance breeds his direct sister, his mother and other close female relative; or (b) a doe carrying the same genes mates with her brother or father. It might even take more than one generation of these "accidental" encounters. Again, this is just my hypothesis, based on what deer breeders have found. We still don't have any science to show it explains huge bucks in the wild.

For several years now I've been working on a project regarding pheromones. These are chemicals (produced by most animals) that affect the behavior or physiology of another. In particular, I've been working on identifying those related to rutting behavior. The scents sold as "buck lure" or "do in heat" are simple collections of excretion products of deer and preserved for use by hunters.

The unanswered questions, though,



The rarity of wild deer such as Ohio's "Amish" buck tells us it takes highly improbable conditions to grow one. Science hasn't yet been able to crack that elusive code.  
Photo by Gordon Whittington

relate to the real secrets of pheromones. A simple concoction of deer urine, collected at a particular time, doesn't guarantee the contents will elicit the desired effect in another deer.

My first wildlife research actually was on pheromones in ants and snakes. What I learned in that work was that a chemical at one concentration, intended to produce one type of behavior, actually can produce the exact opposite behavior at a different concentration. With whitetails, the unanswered questions about pheromones relate to which chemicals are involved (usually dozens of them), how long they last in the environment and at what concentrations do they have a given effect? We've made significant strides and now have some workable solutions with promising results. But there's much more to learn — especially when the glands that produce some of the pheromones don't actually deposit chemicals into the urine.

The most recent mystery needing a solution involves the whitetail's recent population decline in a number of areas. There appears to be more than one causal factor. Unless we develop a long-term, well-coordinated research program with the goal of identifying these factors and developing ways to mitigate them, I'll remain convinced the heyday of trophy whitetails is behind us. Perhaps I'm being an alarmist, but my position is based on a career of experience with managing deer populations. Time will tell if I'm right or not.

Even as I finish this article, more questions come to mind. For now, however, I hope those presented will encourage some young wildlife scientist to make a career of answering them. Of course, along the way more questions about our favorite deer species are sure to arise. The whitetail has always been a master of revealing to us only what it wishes. **NAW**

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