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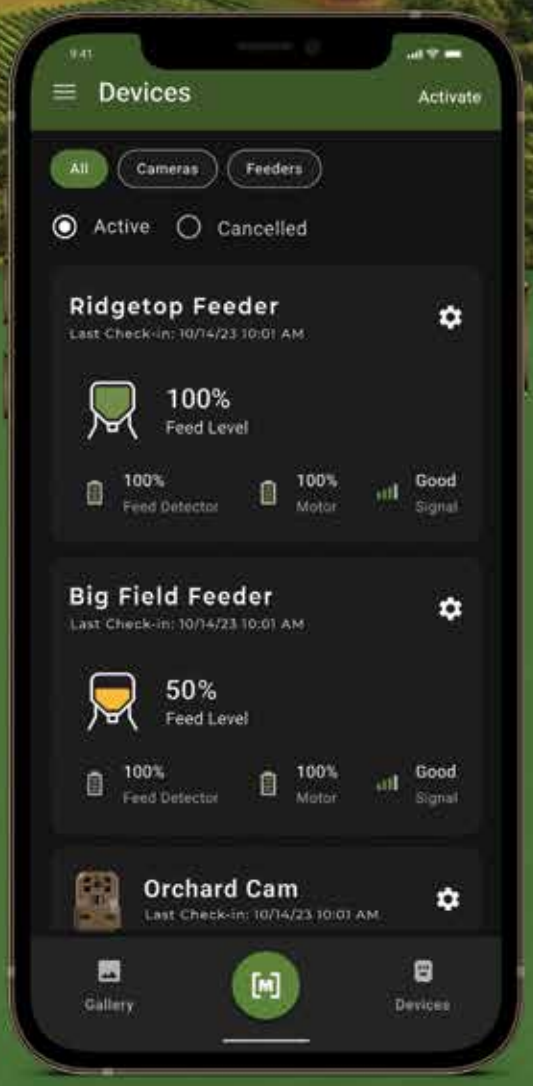

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Earlier, I mentioned our unwavering desire for superiority in everything we do. You can rest assured that commitment doesn't end at the sale of a product. Honestly, selling a bag of seed or mineral isn't why we come to work each day. Our in-house experts — including consultants, wildlife biologists, agronomists and weed scientists — aren't just the best in the business. They're also your team of experts. That's right, we're here for you every step of the way, whether you're new to the idea of whitetail nutrition or a seasoned individual managing 1 acre or 1,000 acres. Our Golden Rule of treating every person we have the privilege of serving the way we'd like to be treated has guided every one of us at the Whitetail Institute of North America since Day 1.

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— William

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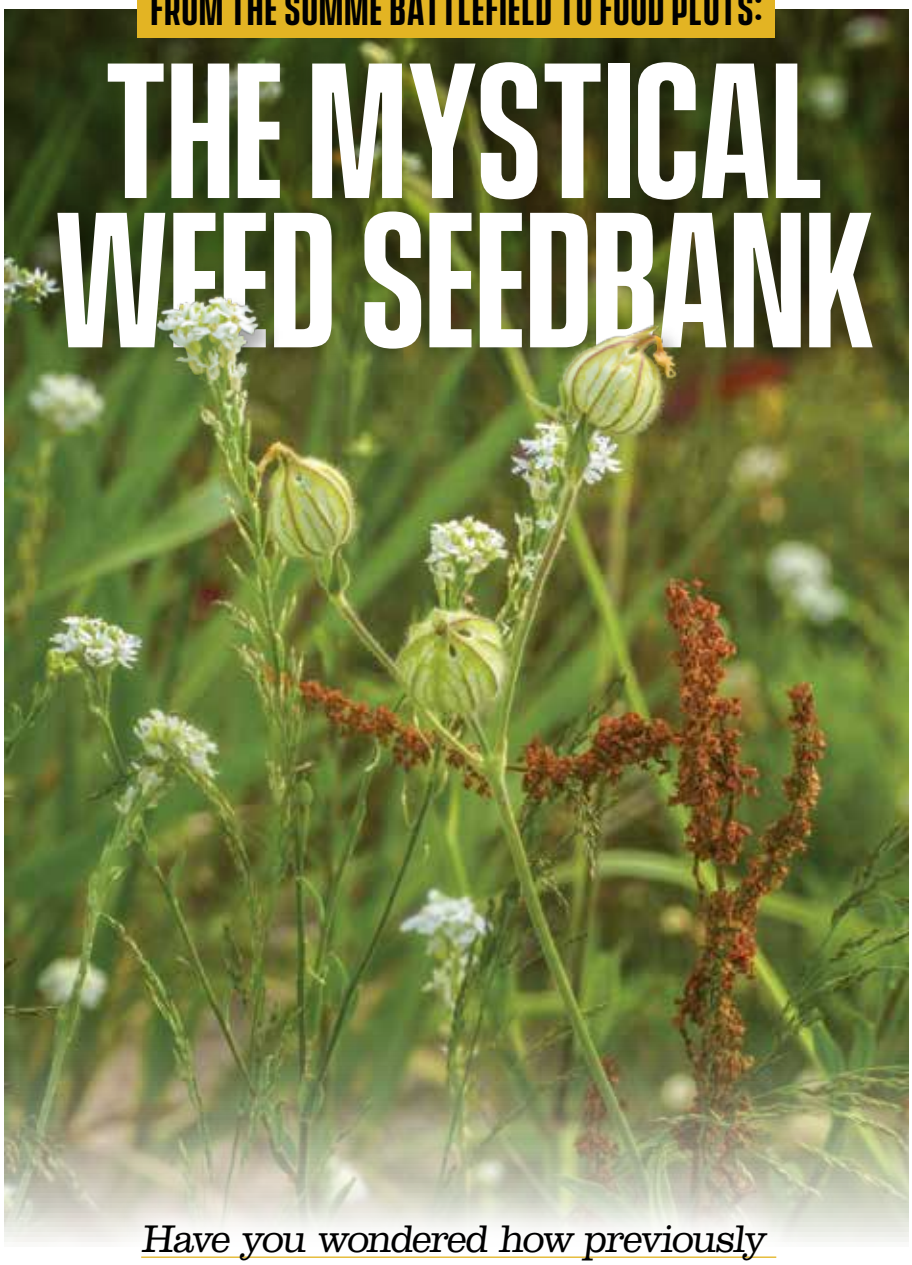
by *W. Carroll Johnson III, Ph.D.* – *Agronomist and Weed Scientist*

FROM THE SOMME BATTLEFIELD TO FOOD PLOTS:

THE MYSTICAL WEED SEEDBANK



Have you wondered how previously unseen weeds sometimes pop up in your plots? The answers lie beneath the soil, but weed seeds are very difficult to see and comprehend.

It's predictable with almost 100 percent accuracy that by midsummer, customers begin contacting me through our main office about weeds infesting their food plots, and they had never seen those weeds until they planted our food plot seed.

The discussion then pivots to how those weed seeds got into their food plot, especially because those weeds had not been seen previously. My response, which is not rote, is that the weeds came from dormant weed seed already in the soil. Weed seed in the soil (called the weed seedbank) is a seemingly mystical concept. Even with 40 years of experience in weed science and agronomy, I have a difficult time wrapping my head around weed seed in the soil. Part of the reason for the abstract nature of the weed seedbank is the small size of weed seed and the formless mass of dirt in which weed seeds are dispersed. Simply, weed seeds in the soil are very difficult to see and thus comprehend. The number of weed seeds per cubic foot of soil could number in the tens of thousands. Convert that value to number of weed seeds per acre and the result is a figure that's best expressed as 10 with an exponent.

AMAZING EXAMPLES

For me and my limitations with understanding abstract events, I find it useful to correlate with real-life observations. My family has a small cabin on Lake Martin in the piedmont region of central Alabama. This reservoir was completed in 1926 to generate electricity and help control flooding. As a result of the latter use, the lake elevation is intentionally lowered in autumn by 8 feet to create storage capacity for winter rain. In 1986, there was severe drought in the region, and the lake never reached full pool during summer. Near our cabin, a small stream flows into the lake, with a delta of sediment deposited in a broad plain — an artifact from when the erodible landscape was in subsistence crop production more than a century ago. That summer, the sediment dried. The result was about 5 acres of cocklebur and smallflower morningglory — common weeds of crop production. That small stream currently drains a watershed that is now totally woodland. Weed seeds in the sediment remained dormant since the delta was normally underwater during summer. The dry summer of 1986 created conditions that were conducive for weed seed germination — in that case, adequate oxygen and sunlight. Weeds appeared where they were not expected.

Another example of weeds sudden-

ly appearing was documented during World War I on the Somme Battlefield in France. Like many battles in World War I, combat was largely in a restricted area for an extended period. What had once been serene pastures and small woodlots was transformed into a wasteland of trenches and artillery impact craters. War had destroyed the topography of the countryside. The next summer, after hostilities moved elsewhere, the battlefield was transformed into a sea of red poppies in full bloom, broken only by the humbling array of white crosses that marked the location of soldiers hurriedly buried where they fell in combat. The Somme Battlefield was the location of a detailed plant ecology study that catalogued the suddenly changed flora and factors that influenced plant diversity. Repeated artillery barrages pulverized the soil and basically plowed the entire area. Soil disturbance caused by combat exposed dormant red poppy seeds to oxygen, sunlight and water. What was once pasture and woodland was destroyed by war but later transformed to a sea of red poppies.

■ Weed seeds come in all shapes and sizes, and it might amaze you how many are in the soil.

PERTINENT FACTORS

Understanding the phenomenon of weed seed in the soil will help anticipate the problem and minimize food plot losses. Several underlying factors affect the weed seedbank, including previous land use, weed seed production, seed dormancy and tillage systems.

Previous land-use patterns: There are few stands of true virgin timber in the eastern United States, and much of our current timber land has been harvested for timber or previously cultivated as farmland, later reverting back to forest. These disruptions will directly influence rapid changes in plant species diversity. If cleared timber land becomes reforested, during the long transition, weeds become scarce and eventually disappear as the new forest matures. Similar processes occur in cultivated sites after crop production ceases. This is what plant ecologists call old-field succession, but starting at different points in the process. Throughout old field succession, the weeds produce large amounts of seed that are stored in the soil.

Numbers of weed seed: Have you ever wondered how many seeds a weed can produce? Weed seed production is influenced by species, weed density and growing conditions. Consider an occasional escaped pigweed in a food plot. Perhaps it's an eyesore but not necessarily enough to affect forage growth on a large scale. However, multiplying the number of escaped pigweeds by 200,000 seeds per pigweed plant produces an enormous number. This does not consider the unknown number of pigweed seeds already in the soil. Using this example, would it not be prudent to pull or mow the escaped pigweed plants before they produce seed?

Weed seed dormancy: Dormancy is controlled by a genetic code unique to each plant species and environmental conditions. During dormancy, weed seeds are in a protected state that might last for many years. A useful strategy to break weed seed dormancy and then reduce weed seedbank numbers in fallow sites is to stimulate large-scale weed seed germination by harrowing the food plot and then controlling the emerged weeds by another harrowing, a nonselective herbicide such as glyphosate, or both. The sequence of tillage to stimulate weed emergence followed by control and then repeating that several times will partially deplete numbers of viable weed seeds in the soil. The longer this sequence is repeated, the better the results. Yes, this is costly and intensive. However, this sequence reduces numbers of viable weed seeds in the soil to a manageable level.

Tillage system: Some contend that tillage brings weed seeds from deep in the soil profile back to the soil surface where germination occurs. That's partially correct, but it's not the complete story. Research has shown that when fields are tilled, 80 percent of the weed seeds near the soil surface are buried, with later tillage bringing only 38 percent of those seeds back to the soil surface. In other words, tillage buries far more weed seeds than it brings back to the soil surface — a significant net reduction. In contrast, sustained minimum-till production systems cause an accumulation of weed seeds near the soil surface, where they can readily germinate when conditions are right. This phenomenon is currently occurring nationwide in minimum tillage systems, with widespread infestations of herbicide-resistant pigweeds (which produce thousands of tiny seeds).

CONCLUSION

It's prudent to assume that large numbers of weed seeds are already in food plot soils. Aggressive measures are needed to reduce the weed seedbank and prevent weed seed production in food plots. Otherwise, weeds will continue to appear in unexpected places. Of equal importance is the understanding that in a food plot, an unpleasant surprise might appear, with a new weed species suddenly appearing from dormant seed. Use that knowledge to be prepared.

by *Joyce Allison Tredaway, Ph.D.* – *Agronomist and Weed Scientist*

CONTROLLING JAPANESE STILTGRASS IN CLOVER

This nasty invasive threatens native plants and natural habitats. Here's how to control it.

About midsummer, Whitetail Institute starts receiving questions about a thick, fast-growing grass often found in forested areas. The grass is quickly overtaking native vegetation, and deer will not consume it. It doesn't take long to figure out that the customer is referring to the highly invasive weedy grass Japanese stiltgrass.

DESCRIPTION

Japanese stiltgrass (*Microstegium vimineum*) also called Nepalese browntop, is an annual grass that's invasive primarily in forested areas. It threatens native plants and natural habitats by its sprawling growth habit and prolific seed production. It forms large, extensive grassy patches that native and natural habitats cannot compete with, thus displacing that vegetation. Where white-tailed deer are overabundant, they can contribute to the spread of Japanese stiltgrass by overgrazing native vegetation, giving the competitive advantage to the Japanese stiltgrass, which is not palatable. It's considered one of the most damaging invasive plant species in the United States. Invasions can also change soil nutrient cycling processes, inhibit tree survival and growth, and reduce light availability. After Japanese stiltgrass dies back in late fall, the thick layer of thatch that's formed is slow to decompose. Infestations of Japanese stiltgrass can also alter soil chemical properties, insect diversity and the abundance of insects in forested areas. A greenhouse experiment showed a rapid rise in soil pH and available phosphorus, which might reduce diversity in soil and microarthropods.

As a warm-season annual grass, Japanese stiltgrass germinates in spring and grows to 2 to 3.5 feet tall. It dies in fall. It

has pale green, alternate, lanceolate leaves that range in length from 1 to 3 inches, with white midveins that are sparsely hairy on both surfaces and along the margins. The throat collar is hairy, with a membranous ligule with a hairy margin. Stems on Japanese stiltgrass are slender and wiry, and can be green, purple or brown. In August through earlv October, the plants have slender flower spikes that are in pairs. After the plant blooms, dry fruits, which are yellow to red, appear. In fall, the plants often appear purple. In winter, the thatch is a bright tan to orange.

Japanese stiltgrass is very shade tolerant. It reproduces by seed, and each plant can produce up to 1,000 seeds that can remain viable in the soil for five years or more. Seeds are very small and can be dispersed by adhering to clothing and animals, as well as by flooding and deposition of fill dirt. Typical habitats include forest edges, roadsides, trails, damp fields, lawns and along ditches. Sunlight and moist soil increase the chances of Japanese stiltgrass establishment and favor its growth. Although Japanese stiltgrass thrives in full sunlight, it's also well adapted to shady conditions. It can establish, grow and produce some seed in as little as 5 percent of full sunlight.

Japanese stiltgrass, a common invasive, has alternate lanceolate leaves.

ORIGIN AND DISTRIBUTION

Japanese stiltgrass was originally discovered in Knoxville, Tennessee, around 1919. It's believed to have been accidentally introduced to the United States through its use as a packing material for porcelain. It's sporadically distributed in the United States throughout most of the East and in the Caribbean, from New York south to Texas, Florida, Puerto Rico and the Virgin Islands. It's currently found in 33 states.

CONTROL

Japanese stiltgrass can be controlled with Arrest Max in any broadleaf forage. The 16-fluid-ounce-per-acre rate should be applied when the grass is about 4 to 6 inches tall. A crop oil concentrate such as SureFire must be included with the mix. Two applications will be needed, with the second application made to treat regrowth or a second emergence of the grass from seed in the soil. This is usually a month or so after the initial treatment. Carefully and regularly monitor the food plot for Japanese stiltgrass regrowth. This needs to be a high priority. Additionally, target small grasses, which will make control efforts more effective.

Japanese stiltgrass is a dense grass that forms a thick canopy, so thorough coverage of the plant is essential. One application of Arrest Max will not work adequately. This grass needs constant attention throughout summer and because of its extensive seed production. Because of the abundance of seed in the soil, plan on controlling Japanese stiltgrass in future summers. This is an effective control option, but to use Arrest Max to its full potential will require intensive managerial effort. Treated grasses are slow to show Arrest Max symptoms. That's the nature of this chemical family of herbicides. Be sure to allow at least two to three weeks for whole plant symptoms to develop.

However, if Japanese stiltgrass has overtaken an area so that a food plot is not salvageable, another option is available. This involves killing the existing vegetation, including your food plots, and spraying a low rate of glyphosate. A rate of 0.25 to 0.50 percent solution of glyphosate plus a 0.5 percent solution of Sure Fire crop oil should be applied to thoroughly wet all foliage. This option should only be used if you want to re-establish your food plots.

CONCLUSION

Japanese stiltgrass is a highly invasive annual weed that can quickly become problematic. However, Arrest Max is an effective herbicide to control it. Applying Arrest Max at the proper time and rate and ensuring adequate coverage will ensure that Japanese stiltgrass will be controlled and will prevent further seedhead production.

GETTING

Few things are more exciting than purchasing a property where you get to call the shots. It's finally your chance to create something you've always dreamed of. However, gaining new ground can also be daunting because there are usually many new projects that need to be done. Sometimes, getting started can be paralyzing. So where is the best place to start?

"First thing I tell new landowners is to look at the neighboring area," says Dr. Grant Woods of Growing Deer TV. "Deer need food, cover and water. Once we look at that, then we decide how to add the most limiting factor."

Woods is the host of Growing Deer TV, a weekly YouTube video series in which he shows how he manages his Missouri property for better deer and turkey hunting. He also owns and operates Woods and Associates, a wildlife and habitat management consulting firm. Woods travels the country each year, assisting more than 50 landowners on how to better manage their property for their hunting goals.

"If you're in the desert, then water is going to be the biggest limiting factor," he said. "If your property is in the middle of agricultural ground, then creating more bedding cover would be better."

Looking at satellite maps, walking the property and driving around the area can help determine if food, cover or water is needed. It's the landowner's job to figure out which one is lacking the most and improve upon it first.

FOOD

If food is the biggest limiting factor on and around your property, food plots are a great tool to implement. When walking the property or looking at satellite imagery, look for old pastures or logging decks. These are areas that can easily be turned into food plots with minimal work. However, there are plenty of

STARTED

Congratulations. You finally bought that hunting property you've been dreaming about for so long. Now that the easy part is done, it's time to roll up your sleeves and get to work. But where do you start?

Text and Photos by *Mark Olis*

properties where food plots need to be cleared. If that's the case, you have options. If your property has a lot of trees and they have timber value, connect with a local forester to develop a plan for selling the timber. If your property has more scrub brush or thicket, focus on hiring a dozer operator or mulching service to come in and clear the land. Also, keep in mind when clearing new areas for food plots how that food destination will funnel deer from areas of cover. By clearing large and small plots near each other, you can create pinch points for hunting stands.

When the land is cleared, the most vital job is to get a soil analysis done. A quality laboratory soil-test kit from Whitetail Institute will ensure that you are putting the correct amount of lime and fertilizer in the soil for your crops. Remember, the reason you added food to the property was because it was a limiting factor. Don't limit the amount of food you can grow per acre because the plants don't have the ideal soil pH or amendments to keep up with browsing pressure.

COVER

Cover is where deer bed and feel safe. Although you might have food and water on your property, without adequate cover, deer will bed off your property and wait until dark to venture in for groceries and a drink. Depending on where your property is, cover can come in many forms. In agricultural country, it can be timber lots, CRP and river and creek drainages. In the Southeast, it can be clearcuts, pine thickets and swamps.

Wood's Ozark Mountains property is heavily forested. Although the timber creates cover, it's not ideal thermal cover when it's cold. So to add cover, he cleared large sections of hillsides and rotated prescribed fire through to maintain them. These open areas allow sunlight to hit the soil surface and, with prescribed

fire, allow a diverse population of native species to thrive. These waist-high plants provide great fawning and bedding cover throughout the year, and in summer, they serve as a high-protein food source, too.

Getting sunlight to the ground is super important when speaking of native species and cover. The more areas where you can create openings in the canopy and use fire on an annual basis, the more deer will use your cover areas.

WATER

Water can often get overlooked because we don't put as much emphasis on it as we do on food plots. However, a mature buck will drink a gallon or more of water each day. That's just one deer. If your property lacks water, deer are leaving it every day to get that vital resource.

There are several ways to add water to your property. Many products collect or store water for wildlife. These can be great additions if you lack water. A lot of hunters will also use baby pools or tubs placed into the ground to hold water. If going this route, be sure to place a stick or log in the water so any small critter that falls in can climb out. The last thing you want is a rotting carcass in your drinking container. A more long-term solution would be to install one or more ponds on the property, depending on the acreage.

■ If your soil analysis tells you to apply lime, get it done as soon as possible. Ag lime takes months to alter your soil's pH.

PLANT TREES NOW

If you plan on planting trees for wildlife food, don't wait. Trees take years to mature and start producing food. The Dunstan variety of chestnut trees from Chestnut Hill Nursery is great for deer. Within a few years, the trees begin producing large chestnuts that deer devour. Late-season pear trees are another highly productive species that puts a lot of food on the ground during deer season. If trees are in your future, plant them now so you have more time to enjoy them.

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Get to know your property. Get boots on the ground, and walk all over it. Learn how the topography works and funnels animals through certain areas. Think big picture when looking at the place. It's important to determine what other plans and goals you have for the land, too. If you plan to raise livestock on the property, that changes your wildlife management practices and goals. If it's a timber investment, you'll have to manage for timber and wildlife. All of these things matter in your game plan.

If adding food to your property is a priority, consider planting mast-producing trees. These Dunstan chestnut trees begin producing high-protein chestnuts within a couple of years.

"Get to know your property before you begin," Woods said. "Often, our views of the property change after seeing it the first time."

It's important to have goals and expectations for your property before beginning any projects. Expectations are one of the biggest things to overcome. Just because you have your land doesn't mean you'll be regularly producing Booner-class bucks.

"Everyone wants big bucks," Woods said. "I want to see landowners go from fantasy to reality. You're managing for the average, not the exception."

Woods tells his clients to look up the average size of bucks killed in their area. He said your goals should focus on managing the top end of the average. Just because someone killed a 180-inch buck in your area doesn't mean you should expect 180-inch bucks regularly.

Whatever your plans are for your property, be sure that having fun and spending time with family and friends is at the top of your list. The best part about owning land is that there is no off-season. There will always be something on the to-do list when managing wildlife. Enjoy it.

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HOW MANY DEE

Spoiler: *That question is difficult to answer and varies depending on many factors. But science-based surveys and common-sense calculations can give you a clearer idea.*

Text and Photos by *Bill Winke*

Seeing deer is a big part of our fascination with managing hunting land. We want to see the resource and interact with it in a way that lets us feel we are adding value to the game and the land. I guess that's what we now call stewardship, and we gain a lot of satisfaction from doing it well. But is it possible that we're looking at this wrong? Maybe seeing a lot of deer is not such a good thing. Can we have too much of a good thing?

How do you know how many deer you have and how many you should have? Managing deer numbers is a never-ending process without a simple set of rules. In this article, I'll take at least a surface-level stab at this big issue.

WHAT IS TOO MANY DEER?

Now I will open a can of worms. I've owned properties in many areas of Iowa and have hunted across the whitetail's range. I have seen everything from 2 deer per square mile in the Interlake Region of central Manitoba to the super-high densities in parts of the Milk River in northern Montana. They poured out of the river bends like ants every evening.

As a deer hunter, I enjoyed the high-density areas better than the super-low-density spots. Seeing deer is fun. You never get bored when there are lots of deer around. But were those high-density herds healthy, and were those deer reaching their genetic potential? Also, when it comes to the satisfaction we get from hunting, is there a point when we lose interest because we never see deer or, conversely, when the pursuit gets too easy?

First, we need to tackle the question of density as it relates to herd health and genetic potential. I have hunted some really big bucks in areas with pretty high deer densities in southern Iowa. It's possible those bucks would have been even bigger had there been fewer other deer in the area. Without a control group (impossible to achieve given the genetic diversity of the deer), it's hard to know. So anecdotally, I've seen a place where it was possible to have a lot of deer and some very good ones.

That was one farm. Just a few miles away, I owned part of another farm for nine years before buying my own land. That farm had an even higher deer density — to the point where farming that property was impossible. The deer ate most of the crops during summer and all of the available browse in fall and winter. There were not very many big-antlered bucks on that large property.

So if antler size is a simple way to judge the health of a herd, there were too many deer on that farm. Because it was only a short distance from the land I later owned outright, the genetic potential should have been reasonably similar on both, but there was definitely a drop-off in antler size in that super high-density bulls'-eye.

I have a very good idea of the deer density on those farms in terms of deer per square mile, but simply comparing the density of one property to another is not an apples-to-apples deal because of differences in the amount of cover versus crops. But again, these test cases were only a few miles apart, so the cover and land use were nearly identical. We had the big property flown one winter by an aerial survey company using a helicopter and scientific methods. One of the other owners was wealthy and hired the crew. The density the surveyors de-

R IS TOO MANY?

termined came out to 150-plus deer per square mile (1,000 deer on slightly more than six square miles).

Based on that number and my years of hunting there, I would say my farm nearby had a density of roughly 110 deer per square mile. I fought hard to keep it that low.

Both farms had roughly the same amount of habitat, (about 75 percent of the land was deer habitat), but I think my farm had more and better food sources. So, looking for a sweet spot, my 110 deer per square mile was at least trending in the right direction. But there were drought years when deer ate everything to the ground even on my farm. So although I saw and shot some really good bucks there, I still had too many deer.

It's really tough to give a one-size-fits-all type of answer to the question of how many is too many. Rather, I hope I'm showing that there is a sliding scale along which results can vary — from too high on one end (the big Iowa farm) to too few on the other end (my Manitoba experience). Maybe the density on the farm I owned was fine for perfect years when winter was mild and spring and summer brought lots of rain and lots of corresponding food. But certainly, deer there were not at their best during the other years, when things weren't perfect. And I have no doubt they ate most of the good browse each year, leaving little to prosper and regenerate. So for all practical purposes, my farm had too many deer.

LOOKING FOR A GAUGE

The sustainability of the habitat during less-than-perfect years should factor into your decision on ideal deer density. I don't want so many deer that they eat all the best browse every year. Soon, the only thing left on the property is the stuff deer don't eat. That's a huge problem in some parts of the country. So, having high-quality habitat (maintained by fire and timber stand improvements, as needed) is an important aspect of determining the perfect density. It's better to err on the side of too few than too many when it comes to habitat.

Another variable to consider when deciding whether you have too many deer is commercial crop damage, where it exists. If you can't grow crops in your fields without suffering heavy damage, you have too many deer. That's what I call the social carrying capacity of your hunting property — the tolerance of nearby farmers (and maybe even cash-rent farmers at your property) for crop damage.

Having deer live within their food and habitat limits is one way to gauge whether you have too many deer, but the experience of the hunt can also come into play. You should be excited to see deer when hunting. It shouldn't become so routine that the mystery and excitement of the hunt is lost. You should feel like you're hunting, not shopping for a deer. If the pursuit loses its challenge, you have too many deer.

A GOOD WAY TO MEASURE DENSITY

I know you want to know the magic number: How many deer is too many? Again, so much depends on the variables that there's no such number I can offer, but let me relate one more experience to help arrive at some kind of standard you can use.

This past winter, a fellow named Jack

If you can't grow crops in your fields without suffering heavy damage, you have too many deer.

Huston stopped by my new farm in northern Iowa. Jack owns Missouri Drone Deer Recovery. He asked if he could demonstrate how he attains a super-accurate deer density and buck-to-doe ratio for any property using his thermal drone. I was skeptical but curious. This new farm has a much lower deer density than the one I owned in southern Iowa, and I wanted to know if thermal drones could give me reliable information and if my estimate of the deer density on the new farm was accurate.

Jack assured me he could count every deer without missing one and could get me a very accurate buck-to-doe ratio. For fun, he asked me what I thought the density was before he flew it. I guessed between 60 and 70 deer per square mile — roughly 65. He openly told me he expected more and that all his clients guessed too low.

Jack used the thermal image output from the drone to find every deer and then used the zoom lens on the drone's camera to determine the sex of the deer. Although the bucks had already shed their antlers (at least most of them), Jack zoomed the lens through the leafless treetops to see pedicles on the bucks' heads. It was amazing.

In that way, Jack kept the drone high enough that it never alerted the deer. They didn't even look up. He made a low-impact survey of the entire farm in about two hours. I was an instant believer. The technology was very impressive, and I would recommend it to anyone where it's legal.

He counted 65 deer on my farm, which is roughly 1 square mile. And the buck-to-doe ratio was around 1-to-1. My guess at the density had been right on the number.

Now, I have a very accurate baseline for my management practices. If I want to keep the number of deer from increasing, I need to shoot about 25 to 30 percent of the adult deer. Because I won't shoot the bucks that hard, I will have to shoot roughly 10 to 12 does this coming season. That's only a good basic target because, like everything related to land and deer management, nothing is really that simple. Given my food plots, I know I will eventually start to attract deer from nearby properties, and that means I will likely have to shoot a few more to stay ahead.

The aerial drone survey method is super interesting and useful, but I also mention it so we have another reference point for a more accurate discussion of ideal deer numbers. This farm has more cover (roughly 80 percent cover) than a typical Midwest hunting farm, so the deer are pretty spread out compared to other places that might have the same overall density.

For the sake of our discussion, I want to compare what I see on this farm to what I experienced on the southern Iowa farm with nearly twice the density. On the new farm, with 65 deer per square mile, I have about 5 percent of the total acreage planted to permanent food that doesn't get harvested and roughly 80 acres planted to commercial crops that get harvested in fall. Little by little, I will increase my food plot acreage.

I have grain left in my grain plots at the end of winter, and there is very little crop damage during summer to the commercial crops. There is no browse line on the trees along the field edges, and the deer appear to be in very good shape. I can grow habitat without the deer eating it immediately. All those factors point to a herd within the carrying capacity of the range.

I could probably handle a few more deer, but I would rather not let the numbers increase. The current herd numbers are comfortably within the range of what I would call healthy. Using good land management practices focused on timber stand improvements and prescribed fire — and maintaining at least 5 percent of the farm in quality food plots — I should be able to produce very healthy deer that fully express their genetic potential well into the future.

Now for the interesting part: I see way fewer than half as many deer on this farm as I saw on the southern Iowa farm. I attribute that to the fact that deer on the other farm had consumed enough of the browse in the timber that they had to use the open fields more. That made them more vulnerable and definitely more visible. Deer that aren't stressed are a lot harder to kill.

If you're watching hunting shows and thinking, "Man, I wish I was seeing that many deer on my fields," you might want to reconsider. In my experience, they are showing the warning signals of too many deer. One of the main reasons their deer flood into open fields early in the afternoons is because there isn't enough browse for them in the timber.

HOW MANY DEER DO YOU WANT?

I know, I'm being evasive and not giving you a hard number. That's because

there is no hard number. Every situation is different. Basically, if you aren't seeing browse lines, deer aren't flooding into your food plots every evening as if they are starved, and you can plant and grow habitat (such as trees and shrubs) without having to cage them immediately, you probably don't have too many deer. But people want numbers. I would say that my density of 65 deer per square mile of cover is pretty good. I don't want more deer, just older bucks.

I mentioned deer per square mile of cover. Density really should be adjusted for the amount of cover, so one good way to think of it is deer per square mile of cover. Areas with deer packed into small parts of big ag farms are overpopulated even if the overall density for the entire farm might sound low. For example, the herd I hunted on the Milk River in Montana might have been close to 400 deer per square mile of cover. There was nothing to eat but the farmer's alfalfa because the deer had wiped everything else out long ago.

Again, if I had to offer a number based on my experiences across the country, I would say that somewhere between 50 to 70 deer per square mile of cover in good ranges (with some agriculture) is probably about right. In areas without agriculture, the number should probably be about half that.

After you get up to about 100 deer per square mile of cover (or more), the overall health of the deer and habitat will suffer noticeably.

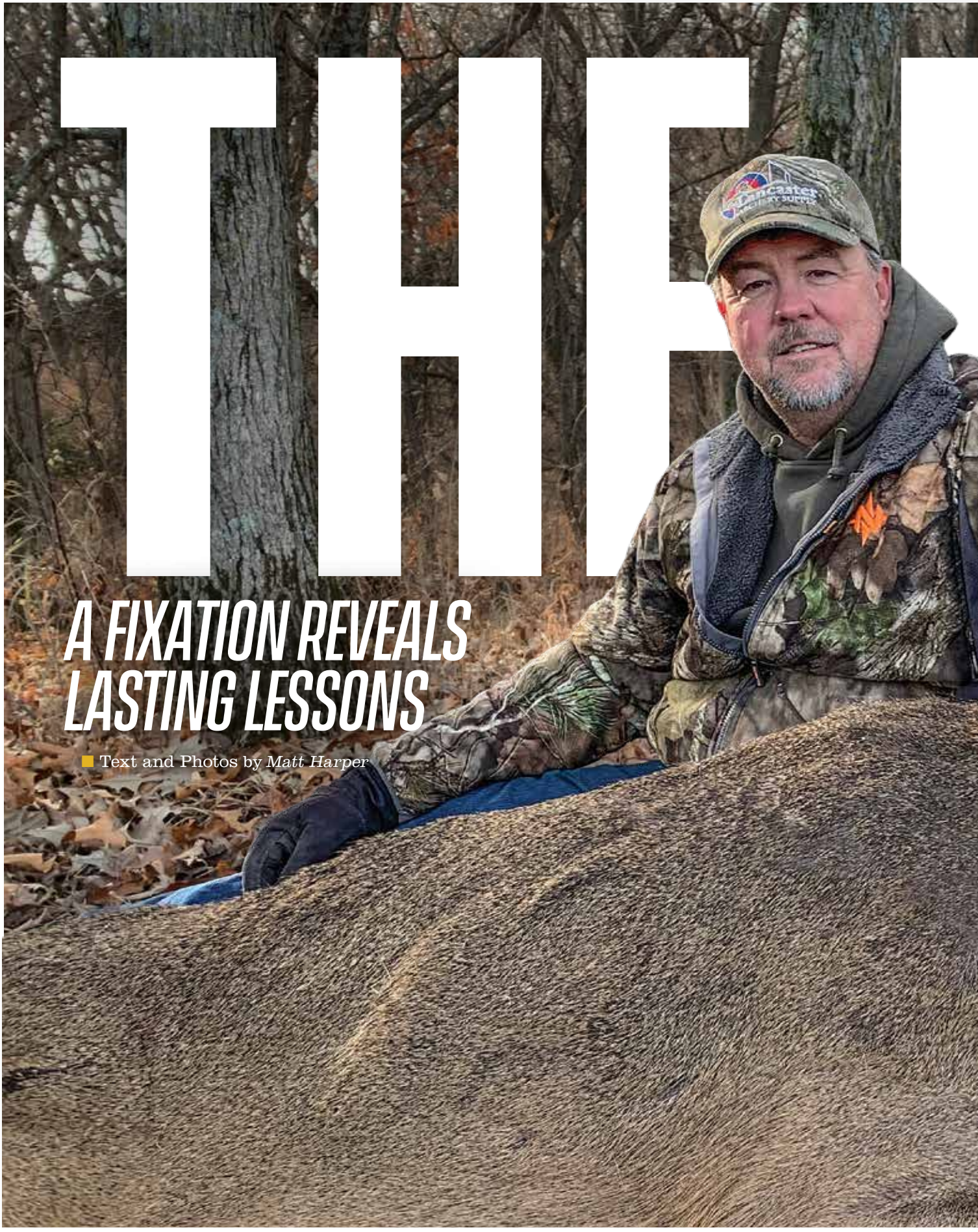
HOW DO YOU LEARN YOUR DENSITY?

Again, the number is less critical than the carrying capacity of the range where deer live. You can tell quickly if there are too many deer just by observing what they have been eating, but if you want a number, there are a couple of accurate ways to get one. The Quality Deer Management Association once published a white paper on how to learn your density using a scientific trail camera method. I had a guy do that on my farm one winter. He was a biologist who worked for Cabela's at the time, and we were filming a series of episodes for them, so it was a cool project to do and to film.

Jeremy found a density of roughly 100 deer per square mile on my southern Iowa farm, with a buck-to-doe ratio of 1-to-1 — the exact numbers I expected. So I trust that method to at least get you in the ballpark. You can search online for that test method.

Still, I have no doubt now that the most accurate survey anyone can get on any property is with a thermal drone. The results Jack got from that device were incredible.

Every situation is different. In some cases, you might be able to increase your density without worry of affecting your habitat, and in other areas, you might need to cut it way back. What I've learned when comparing my new farm to my old one is that it's easy to talk yourself into carrying a lot of deer. Everyone in my neighborhood was doing that. It was fun to see them, but it's not what is best for the deer or the habitat in which they live.



THE

A FIXATION REVEALS LASTING LESSONS

Text and Photos by *Matt Harper*

A November encounter made the author decide he would focus solely on the big 8-pointer the rest of the season.

The author typically doesn't focus on one deer, preferring instead to target any mature buck. But a special 8-pointer changed that and led him on a series of adventures.

Hunting the old buck created memories the author will hold dear long after the last venison has been consumed.

I know what you're thinking: That's not a very creative name for target deer.

I suppose that's true compared to some of the more colorful names for big bucks, such as Methuselah, The Rock, King Reginald or other nonsense. Although I've spent much of my life trying to put words together in an entertaining fashion, many of my most memorable deer had somewhat pragmatic titles, such as Big Bases, The Big 5, Tall Tines and The Monster 8, which obviously leaves little interpretive leeway about what the buck had on its head. I didn't even name several bucks, simply referring to them as "that big 10 on Grandpa's farm," for example. Then again, I've yet to evolve enough to assume many of the rituals of modern deer hunters. I don't paint my face. I've never walked to the deer stand naked and pulled my hunting clothes from a hermetically sealed container when I reach my tree. I've never claimed I could tell you where a mature buck will be at any given hour based on a prolific amount of camera surveillance. And although I've been involved in deer nutrition, management and food plot sciences for about three decades, I can't and won't ever tell you that any product, whether growing or dumped on the ground, will guarantee you a trophy. Before sending me hate mail, I have nothing against anyone who does any of that. If it's legal and that's how you like to hunt, knock yourself out.

I guess my more traditional approach to deer hunting is a symptom of my age, being a few years too old to understand some of the mainstream facets of in vogue hunters. Or, maybe it's because I'm simply not that good of a hunter to think I can successfully use those modern techniques. For example, I rarely go after a buck with singular focus, fixating on one animal. I have passed big deer because I had my focus set on a special buck I had seen at a farm. But unlike some hunters, I seldom set my mind on one deer. Rather, I keep my options open for any mature

buck. My trail cameras tell me, "If that deer shows up, I would shoot him," but I don't have my system down to the science of learning the habits of one animal so I could pick out his scat from that of other deer. When I'm buck hunting, maturity is my measuring stick, and if a deer has a high-scoring rack — which most older bucks do, anyway — all the better. I don't want to come across as some self-righteous guy who looks down my nose at harvesting other types of bucks. Through the years, I've taken my share of younger bucks; sometimes on purpose in my early days and sometimes by accident because my trigger finger decided the age of a buck before my brain did. But in my current stage of hunting life, I like going after old, gnarly, scarred-up bucks that look more like an angus bull walking through the woods. If a buck meeting that criteria walks within range, bow or gun, I will probably take a crack at him.

But sometimes, a deer catches your eye so much, by picture or in person, that you will risk not filling your tag only to get a chance at that buck. Sometimes, it's the size of the buck. Other times, it's because you have lost the battle of wits with him so many times it becomes an obsession. The Big 8 in this story was just such a buck. He was a big, mature buck, but the reason I broke from my normal approach had far more to do with the fact that the Big 8 had bested me again and again and almost killed me once.

A GREAT DEER. BUT ...

If you're a bowhunter who likes hunting big whitetails, there are few places better than Iowa. Sure, Iowa has big, mature bucks, but its deer hunting laws are also advantageous for archers. Bow season starts at the beginning of October, and other than a week of early muzzleloader hunting in mid-October, a bow is the only method you can use until gun season in early December. With the rut typically running from late October to late November, a bowhunter can be alone in the woods during this magical time. So come October and November, you will find me in a tree, bow in hand, listening for that blood pumping sound of a deep-throated grunt emanating nearby.

Before the 2023 bow season, I performed my normal process of putting out multiple cameras to see what was out there. In late summer, I got my first look at the Big 8, as he appeared in a food plot bordering a large wooded area that has traditionally held old bucks. No doubt, he was impressive, with tall times, a wide spread and good mass. He was certainly mature, and I have an affinity for large 8-pointers. Then again, I had pictures of several old bucks on the farms I hunt, a couple of which would score in the Boone-er range. So although I decided that I'd shoot the Big 8 if I had the chance, I was not fixated solely on him.

In fact, in early November, I hunted another farm on the coldest morning of the first half of November. I was perched in a ladder stand 18 feet up a big white oak that, along with its brethren, dominated a ridge-top flat on the eastern side of the property. It was a new set for that season, so I was excited — as you always are the first time hunting a new stand — to see if I had made a good choice.

It's usually a 50-50 chance that I get to my morning hunting spots on time, and sure enough, I was late that morning. It was the first truly cold morning, with temps in the high teens, and as I dug through the back of the truck, grumbling about my tardiness, I realized I forgot my heavy jacket. Knowing I wouldn't last 30 minutes without additional insulation, I drove to my folks' house and stole an aged brown chore coat that smelled heavily of sheep and cow crap mixed with a slight aroma of alfalfa hay. You would never find this coat in the hunting section of a sporting goods store, nor would you find a bottle of the fragrance that saturated the coat, but it was probably better than any high-dollar alternative I would have pulled out of my closet. It didn't matter, because in my haste to get in the woods, the coat apparently slipped out of my pack straps somewhere in the pasture between the truck and my stand. So I said to hell with it and decided to sit there anyway, warmed by my annoyance. Within five minutes, I had a nice young 3-year-old buck push a doe under my stand, grunting as he went. About an hour later, with no more deer sightings, the cold was beginning to become very persuasive, tempting me to quit. Then a doe came hot-footing out of a hidden draw below the ridge and sought a hiding place in some brush. She paused and looked behind her, and a very low, deep, guttural grunt floated up from the draw she had vacated. Having elk hunted some, I know there's a continuing debate about determining the size of a bull by its bugle. I've not elk hunted enough to have a strong opinion either way, but I know a big buck grunt when I hear one, and the grunt that flowed through the icy November air that morning was not from a youngster. Seconds later, the 3-year-old I had seen earlier trotted into view, and I sat there second-guessing my assuredness. Then the grunt echoed again, and the young buck bolted up the trail to avoid what was coming behind him. The buck was big, and not just with a big rack. He had a huge body. His face was almost white and sported the thick, somewhat nontypical look of a rack on its way down in score but not impressiveness. I had never seen that deer, but it took me a nanosecond to decide to draw. He gave me a beautiful 20-yard broadside profile shot, and soon thereafter, I stood looking at him, contemplating how I was going to get the big deer out of there. He weighed 309 pounds on the hoof and had barely a tooth in his head. I was ecstatic. Still, my pursuit of the Big 8 wasn't finished.

FRUSTRATION AND FEAR

In Iowa, you can get an extra landowner tag for whatever season you choose. It was the beginning of the rut, so I grabbed another bow tag and set out in search of another taxidermy bill. I decided to hunt the farm where I had pictures of the Big 8, not just for him but any of the other mature bucks I had on camera. The first day, I went to a tried-and-true stand where I've had lots of luck. It sits at the end of a wooded draw that functions as a travel corridor and is bordered on the east by a 2-acre food plot. I got out late again. This is one of the closest stands I can get to, and maybe that's why I use it so much. Regardless, that's where I sat that November evening. About 30 minutes before dark, after several does and young bucks had filtered onto the food plot, I saw a wide, tall, big-bodied buck appear at the edge of the plot, but from the travel corridor on the opposite side of the plot. It was the Big 8, and he was far more impressive in person than on camera. He confidently chased off a couple of smaller, younger competitors and started dogging a doe relentlessly around the field. He came close to my outer limit of shot confidence. Then he'd chase the doe away only to turn around and chase her back toward me. For 15 minutes, the game continued. Finally, the doe left, having had enough of the buck's advances. Usually, deer enter or exit from the travel corridors on either side of the field, but her retreat was through an open picked bean field and then over the hill and gone, with the Big 8 in tow.

I already had a strong desire for that buck but was not yet totally smitten. That next step occurred a couple of days later, as I made my way to a stand on another part of the farm, closer to where I had first caught the buck on camera. Most of the ingress was along an ancient wooded railroad right-of-way, but the last 50 yards cut a across the corner of a hay field. It was just breaking gray light, and when I stepped from the protection of the trees, I came face to face with the Big 8. OK, maybe not exactly face to face, but he was just 40 yards away and staring straight at me. The early morning fog was still low on the hay field, and he was just at the edge of where the light and mist would let me see him. He looked almost mystical. Whatever happened in that moment was the catalyst that made me decide this deer was the one I would hunt the rest of the season. After a few long moments, the buck simply turned and disappeared into the veil.

A few days later, I was back on the stand where the first sighting had occurred. About 30 minutes before shooting light ended, The Big 8 emerged from the same trail as before. He was on a doe again, but this time, after a couple of minutes of being pushed around the field, the doe decided to do what she was supposed to and came through the field right past my stand. The buck began to continue his pursuit when a brute of a 10-pointer charged onto the field, and a fight commenced. The Big 8 won the day but apparently got distracted enough to lose interest in the doe. He soon found a replacement doe that led him in the other direction.

Changing tactics two days later, I decided to sit in a stand in a willow tree on the opposite side of the plot, where the buck had appeared twice. It was an older stand I had set up several years earlier and hunted very little because it only offered a brief shot at about 40 yards. But in an attempt to adapt and change my luck, I inched up the decrepit stand, replaced a couple of straps and settled in. The evening was perfect, deer were moving early and the wind was right. It was cold but not numbingly so, and hope was running high. Two hours before dark, I heard a deep grunt from the tangled mesh of willow branches that surrounded the trail I was sitting over. I caught a glimpse of a deer. It was him, and he was coming to me on a perfect line. I'm not about to say I stay calm when big deer move into my shooting window, but I have shot few through the years and can typically keep it together. Admittedly, however, I was a bit more rattled than normal this time, and I didn't think through the next steps in the process. I had to turn slightly in the stand to my right to draw and apparently subconsciously decided that standing was too risky. So, from a sitting position, I shifted my weight, sticking my left foot out a bit to brace for the draw. Again, it was an old stand, with a smaller plat-

form than what I was used to, and my foot slipped off the platform. Because most of my weight was supported by that foot, my entire bulk shifted forward, and I felt myself begin to tumble face forward out of the stand. Somehow, I grabbed a railing, which thankfully held, and only dropped a couple of ladder rungs down before I caught myself. I don't think the buck knew what was happening, but he wanted no part of it and left. When I dragged myself back into the seat, let the adrenaline subside and settled down a bit, my first reaction was extreme anger. He had been right there where he was supposed to be at 40 yards, and I had jacked it up. Several minutes later, I realized I was an idiot for thinking that. I should have been thankful I was not stuck head-first like a pole 18 feet below in the swampy mud. I was blessed for sure but still frustrated with myself.

A SURPRISE CONCLUSION

Bow season ended, and the Big 8 did not reappear, so I waited an agonizing three weeks for the late muzzleloader season to open. On Day 1 of smokepole season, I headed to the same plot but climbed into a shooting house where, unless my physical faculties left me, I would not fall. It was a horrible day for late-season hunting. The plot was in good shape, but there was no snow, and temperatures hovered in the upper 50s. Deer movement was slow, and after an hour, a doe and fawn crept out to grab some supper, but that was about it. I wasn't paying much attention and looked up from my phone to see antlers among the same willow branches where I last saw the doe and fawn. I could not believe what I seeing, but there he was, the Big 8, out during an evening he shouldn't have been — certainly not that early.

He trotted into the field, and I thought he would simply walk right off the field and again elude me. I yelled something. I'm not sure what the sound was, but it worked, and he stopped at 70 yards.

My oldest daughter's boyfriend was hunting the same farm that night but at the opposite end. Ironically, he had shot a beautiful 10-pointer about 30 seconds before I pulled the trigger. He said he heard my shot, but I didn't hear his, maybe distracted at the business at hand. After photographing and loading his deer, we began blood trailing the Big 8. I had a couple of moments of panic when we lost blood, but the old bruiser had only made it 50 yards and was piled up in a wild rose bush.

Like many things that can be good or bad, fixations can cause harm or be healthy. I don't know which category my fixation with the Big 8 fell into, I suppose a little of both. Regardless, it ended in my favor, and in retrospect, I can now see the blessings that came from hunting this deer. The encounters created memories I will always hold long after the last tube of deer sausage is consumed. Falling from a tree is not worth any animal, and moments shared with friends and family are richer than those alone. Ultimately, the hunt for the Big 8 gave me more than just the animal I pursued, and it couldn't have happened in better fashion.

AGING BUCKS ON THE HOOF

If antlers are your only guide, you're doing it wrong. Use these tips to more precisely age bucks.

by *Scott Bestul*

When I was a budding deer nut, my uncle Lawrence — in his 70s then, but one of the best shots with a slug gun I've ever seen — used to offer $2 to any youngster willing to field-dress his buck. I was happily tending to a pretty 6-point Lawrence had dropped when he ticked off the points on the rack, grinned at me and announced, "Six-year old."

Lawrence was joking, but I'd bet a good portion of our hunting crew would have believed him. Remember, that was almost 50 years ago, and what most deer hunters knew about whitetails was, A) bucks were legal, and B) they were good to eat. These days, hunters in my old stomping grounds pass most yearling bucks (like Lawrence's basket-racked 6), and even let most 2-½-year-old bucks walk, hoping for a chance to hunt a more mature critter — hopefully wearing a hefty set of antlers.

Obviously, things have come a long way, and many hunters are pretty proficient at judging a buck's age by simple observation. Still, it's an imperfect art, and most of us can get better. With that in mind, I chatted with an expert — Kip Adams from the National Deer Association (https://deerassociation.com/), who not only reviewed the basics of buck aging but also directed me to a fun video that tested my skills.

Here are three basic rules for buck aging, as well as the guidelines for each age class.

■ 2-1/2-year-old bucks have some muscling in their shoulders and swelling in the neck, but their legs still appear to be too long for their bodies.

■ 1-1/2-year-old bucks have a skinny neck, long legs and a slim body that makes them look lanky.

THE RULES

* Rule No. 1: Ignore the antlers. OK, we're deer hunters, so this is not going to happen, and Adams admits it.

"I'm no different than anyone," he said with a laugh. "The first thing I look at when I see a buck are the antlers. But when it comes to determining age, they can really fool you, especially when we get away from the country we're used to hunting and the deer that live there. I primarily hunt Pennsylvania, and you take the antlers from a 2-½-year-old buck there and put them on a smaller-bodied deer, and they're going to look huge. Conversely, put that rack on a monster-bodied Canadian buck and they'll look tiny.

"So while there's a big variation in antler sizes, the general body characteristics of bucks as they age are pretty consistent regardless of region. That's why managers focus on body traits when determining age. I only factor in antlers as a tie-breaker, when I'm on the fence about a buck's age. A beefy 3-½-year-old might have similar body characteristics to a buck a year older, but a slimmer rack might give him away."

* Rule No. 2: The best aging happens during the rut.

"Unless you know a specific deer, summer and the post-rut are poor times for estimating age," Adams said. "In summer, bucks are slim and skinny, with small necks. And in the post-rut, they've also lost a bunch of weight from the rigors of breeding season. But during the late pre-rut and for several weeks, bucks are at their physical peak, and the body characteristics of the different age classes are most visible and apparent."

* Rule No. 3: Get multiple views. The more looks you can get at an individual buck, the better, Adams said.

"In some hunting situations, particularly in the timber, we might get only a few seconds with a buck to note body characteristics and estimate age," he said. "It's far better to see him in a field or food plot and have some time to spend. Some physical features aren't apparent, and sometimes the buck's body position won't let us see the neck, shoulders or hindquarters. All are critical when estimating age. Obviously, the more time you have to observe the buck the better. And if you have trail cam pics, those can be considered, too."

GUIDELINES BY AGE CLASS

With those guidelines in mind, here are the basic things to look for as you try to assess a buck's age.

Yearling (1-½-year-old) bucks:

So, how old is this buck? (Hint: You're probably wrong.)

"These are the easiest bucks to age, because they basically look like a doe with antlers," Adams said. "Skinny neck, long legs and a slim body that makes them look lanky. There's a definite line of separation between the neck and shoulders and very little muscle definition. There will be little to no staining on the tarsal glands from rub-urinating. While some yearling bucks can have as many as 10 or 12 points, the spread is almost always within the width of their ears."

2-½-year-old bucks: "Two-year-olds have legs that still appear too long for their bodies, and they still have an overall sleek appearance. They've developed some muscling in their shoulders and slight swelling in their neck during the rut, but their waist is still thin. During the rut, there may be some staining on the tarsal glands, but it will not be as dark and pronounced as it would be on an older deer. In areas with good nutrition, the antler spread may be as wide, or slightly wider, than the ears."

3-½-year-old bucks: Adams likens 3-year-olds to a football linebacker. "They're strong and muscled but still lean," he said. "I also compare them to a thoroughbred racehorse. Their shoulders are well muscled, and there's tremendous swelling of the neck. But the sure way to differentiate them from older deer is a 3-year-old will still have a lean waist. There will be heavy tarsal staining in the rut and a noted jump in antler growth. Some bucks will exhibit 50 to 75 percent of their antler growth potential as a 3-year-old."

4-½-year-old bucks: Although 2- and 3-year-old bucks can be compared to late-teen and early 20s men, 4-year-olds are knocking on the door of full maturity, Adams said.

"Because their stomachs, chests and necks are now fully developed, most 4-year-olds have legs that appear too short for their body. They have fully muscled shoulders and heavy swelling in their neck during the rut, and their waist has dropped down to become even with their chest. In areas with good nutrition, they'll reach 75 to 90 percent of their antler growth potential. They also have a lot of tarsal staining, and during the rut, the stain may extend below the tarsal gland."

5-½- to 7-½-year-old bucks: We're getting into some rarefied air here. Although the mature buck harvest has been increasing across whitetail range of late (meaning more people are holding out for older deer), bucks that grow more than four sets of antlers are special critters. And again, Adams said body type — not antler size — is the best indicator.

"To me, one of the biggest tip-offs are legs that look too short for their body, and a pot belly and sagging back," he said. "And of course, they'll have a massive, swollen neck and heavily muscled shoulders, as well as heavy tarsal staining below the glands. I've seen bucks in this age class that remind me of a small cow."

8-½ and older: Now we're talking the stuff of jackalopes and chupacabras. Even in intensely managed Texas spreads or the most sprawling farm in the Midwest, getting a buck to survive winters, predators, vehicles and hunters (yeah, we're at least fourth on the mortality list when bucks are this old) for seven-plus years is approaching miraculous. How do you recognize such an ancient warrior?

"These bucks have passed their prime and regress in body and antler size," Adams said. "They generally have loose skin on their face, neck and shoulders — usually visible as a 'chin flap' — and they may have pointed shoulder and hip bones. Their antlers can show age-related abnormalities, such as abnormal points, or wavy or curvy tines, and they have an overall weathered appearance."

KNOWING FOR CERTAIN

These are only guidelines, and bucks are no different from humans. They come in a lot of body shapes, sizes and proportions, and it's easy to get fooled, especially if you're seeing a buck for the first time. Also, the system tends to break down as bucks graduate from 3-½ years old and mature into true adulthood. To be certain of a buck's actual age, the most sure-fire way is to submit a tooth for cementum annuli aging, in which a cross section of the buck's tooth is examined under a microscope and — much like aging a tree — growth rings are counted. There are several facilities that offer this service, but one of the most established is Matson's Lab (https://matsonslab.com/). Obviously, the biggest drawback to this system is that you must harvest the deer.

For hunters wanting to get better at field-judging deer, check out a fun, informative look at this art by viewing the NDA video, which concludes with a 20-buck test to challenge your skills. https://www.youtube.com/watch?v=h5TK-c-HHdg.

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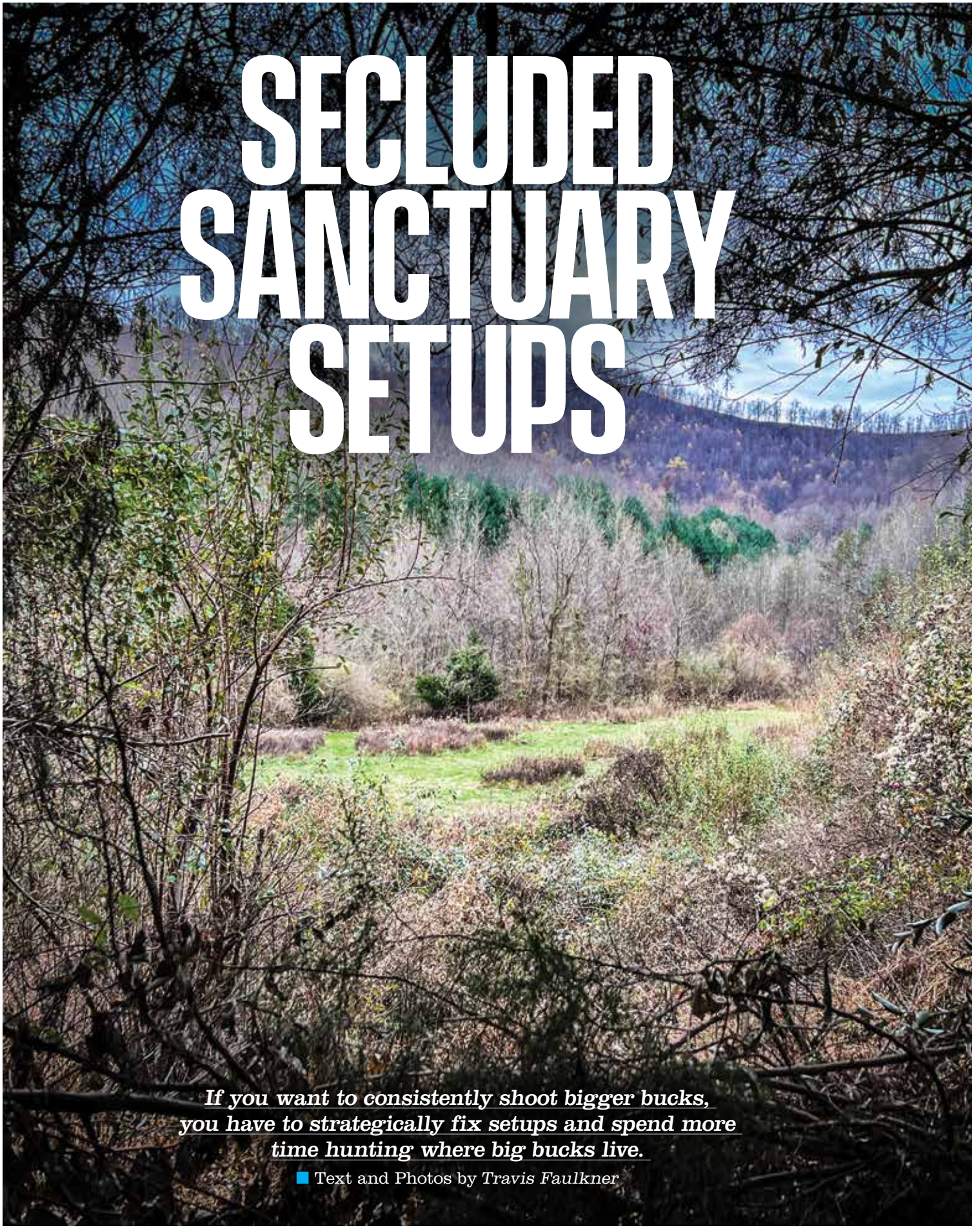

If you want to consistently shoot bigger bucks, you have to strategically fix setups and spend more time hunting where big bucks live.

Text and Photos by *Travis Faulkner*

When targeting and hunting mature bucks, you must remember a general rule: Hunt where big bucks are, not where they were or where you think they should be. In other words, you can't shoot what's not there.

I know that's a double negative and grammatically incorrect, but it rings true in the real world of whitetail hunting. Let's face it: Sometimes, you have to think outside the box, push things to the outer limits and be willing to take calculated risks to generate shot opportunities on challenging older bucks that seem unkillable.

You can buy the fastest and most accurate bow, wear the industry's best hunting clothing, and patiently sit for countless hours in the most comfortable, deluxe tree stand, but none of those considerations are as important as how and where you hunt. Let's look at some hard-hitting tips and game-changing tactics that helped me close the deal on one of the toughest bucks I have ever hunted. These techniques might help you flip the script and give you the edge to make something big happen this fall.

THE NOCTURNAL NIGHTMARE

A few seasons ago, I became tangled-up with a super slick Appalachian Mountain buck that basically had me running in circles, chasing my tail. Nothing I tried seemed to bring me closer to even seeing the heavy-racked 10-pointer during daylight, much less getting a clear shot at him. At one point, I was operating and monitoring about 15 trail cameras in a desperate attempt to establish some type of pattern I might exploit. After a couple of weeks of checking, moving and adjusting my network of cameras, I gathered valuable intel on the buck.

For example, I learned where he consistently visited mountain ridges and benches that were dropping white oak acorns. Many pictures also revealed other feeding areas he would hit frequently, such as some creek-bottom green fields and old overgrown coal strips that held clover, honeysuckle, greenbriar, autumn olive berries and other types of browse. I knew what sections of the creek and which ponds were his preferred watering holes. I pinpointed and watched the buck establish early rub and scrape lines through multiple trail cams. My around-the-clock surveillance even revealed the buck's most frequently used travel routes and, most important, his favorite bedding area, which was tucked deep inside his daytime sanctuary.

The only problem was that the buck had developed nocturnal tendencies because of surrounding hunting and poaching pressure. Most of his feeding activity and movement outside the sanctuary occurred after dark and throughout the night. In the beginning, I tried textbook setups strategically located between the buck's daytime bedding area and feeding locations. These were the types of conservative setups I could safely enter, hunt and exit without bumping him or other deer. I even hunted along his major travel corridors and staging areas, and directly above his most used scrape and rub lines, where I was getting some daytime trail-cam pictures. Unfortunately, none of that really worked.

Next, I turned up the heat a little and went with more aggressive setups along the perimeter of the buck's daytime sanctuary and bedding area. On a few morning hunts from those spots, I had several close encounters with the buck as he passed within bow range about 45 minutes before daylight on camera. In the dead silence of the pre-dawn darkness, I heard him slowly working past me in the dry leaves, with heavy steps that were taunting and nerve racking. Needless to say, this was driving me crazy, so I got really sneaky and constructed a mock scrape along the outer edge of where he was entering the massive thicket. The plan was to stall him a little and hopefully buy just enough shooting light to close the deal.

I captured trail cam footage of the buck working my mock scrape the first night he exited the thicket and the next morning upon his return. Occasionally, the buck would hit the scrape when there was barely enough light for the camera to kick off from the night-mode setting. However, that didn't occur consistently enough to establish an exploitable pattern, and it usually happened when I was at work. Consequently, I had several more pre-dawn encounters with the buck visiting the scrape before daylight right below my tree stand, but it was always a little too dark to shoot.

Do you know how painful it is to sit in your tree stand listening to your No. 1 target buck violently kicking out dirt with his hooves and thrashing the overhanging branch with that thick rack? I know exactly how that feels, and it isn't any fun. At about 15 yards below me, I distinctly heard him urinating into the scrape, rubbing his tarsal glands together and taking deep breaths throughout the gut-wrenching process. Each time, I sat helplessly, praying for shooting light, while trying to make out the dark, shadowy images of his massive body. It was a nocturnal nightmare for this ol' mountain boy.

PUSHING THE ENVELOPE

Something had to give, and I needed to get even more aggressive with my hunting strategies. To make matters worse, I had other hunters surrounding and circling the property, which made me feel like Davy Crockett at the Alamo. Plus,

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there was a local poacher trespassing and spotlighting the open creek bottoms at night. He even stole some of my SD cards from two of my security-cable-locked trail cameras, which likely contained pictures of him spotlighting. With the rut and rifle season approaching in a few months, I needed to think outside the box and push the envelope before something bad happened to the buck.

At that point, I knew exactly how the buck was entering and exiting the enormous overgrown clear-cut thicket. On a stormy day during the week, I slipped into the back side of the thicket and cleared-out about a 50-by-50-foot square opening within semi-close to where I found most of the larger deer beds. The wind and rain from the storm helped keep my scent, noise and movement into this sensitive area less detectable. With handheld tools, including a rake and folding saw, I cleaned away the ground clutter and cut overhanging branches to let more sunlight reach the surface. I planted a shade-tolerant food plot mix, added fertilizer and lime, constructed a mock scrape and made a natural makeshift ground blind from the surrounding pine and cedar branches.

The next steps involved placing a cell camera with a solar panel to extend battery life and reduce unnecessary intrusions into the highly sensitive area to check pictures and change batteries. Last, I carefully cleared my entry and exit trail so I could quietly enter my sanctuary ambush setup without being busted. The surrounding dense cover around the narrow trail served as a wall that would help shield my movement when approaching and exiting the site. Then, all I had to do was monitor deer activity from my cell camera on my phone and wait for the right wind direction and hunting conditions to make my move. This was a bold, risky strategy, but I had to roll the dice and make something happen before it was too late.

Within a few days, I was getting multiple pictures of deer, including my target buck, frequenting the area and working my mock scrape. The cell camera let me monitor the growth of my ambush plot and determine how and when the big 10-pointer was entering and leaving the site. Further, I could check the camera from my cell phone before entering the setup, which dramatically reduced the chances of me bumping and spooking deer. The ability to gather current scouting intel in real time changed everything, and it helped eliminate a lot of unproductive areas or setups with minimal effort.

With my cell cam in place and secluded sanctuary setup ready to go, I felt confident about everything. Finally, a few weeks before the opening of rifle season, I began getting fairly consistent early morning pictures of the buck at first light and later during midmorning and midday. He would also browse in the ambush plot and work the mock scrape until leaving the sanctuary after nightfall. However, the trail camera I had placed on the edge of the thicket where the buck typically entered was showing a major change in activity. The cooler temperatures brought increased hunting pressure, and the buck started entering his daytime sanctuary around 4 a.m., which was three hours before daylight.

As a result, the buck generally worked toward the ambush plot setup near the back of the thicket right at daybreak. Then he'd make a return visit later during midmorning, after he had been bedded down for a few hours. I knew those critical periods presented my best window of opportunity. I waited for the right wind direction and conditions before carefully sneaking into my setup on a bitter-cold morning about 2:30 a.m. I didn't use a flashlight and slowly moved into position on my clean entry trail without making any noise or bumping deer. That marked the first time I hunted the secluded sanctuary setup, and everything felt right.

Toward the end of the first hour, I heard the distinct sound of deer approaching the ambush plot in the darkness. I barely made out the shapes of multiple deer bodies as they browsed along the opening within 20 yards of my makeshift ground blind. I was confident this was probably the family group of three floppy-eared does I had been routinely getting on camera. As I had hoped, the does fed around me without spooking, which was a great sign that the risky move and high-stakes setup might work.

About 45 minutes later, I heard something much heavier walking toward me, and it paused momentarily every few steps to listen, look and likely check the wind. When it finally entered the small opening of my ambush plot, I immediately saw the dark outline of its body was much larger than the three deer from earlier. It browsed for a brief period before hitting the mock scrape. I clearly heard the sound of its rack tickling through the limbs of the overhanging branch, and my heart began to sink, because it was still an hour or more before there'd be enough shooting light. Then everything grew deathly silent as the deer slowly eased out of the opening and faded into the surrounding darkness of the thicket.

My mind was racing, and I was worried that it might not happen, but I held onto the hope that the buck would likely return again at midmorning or later after bedding down. Several more deer visited the ambush plot after daylight, and they seemed relaxed and secure while feeding, which helped strengthen my confidence. A few more hours passed, and I began to thaw out a little after the long, cold sit. As the feeling started to return to my frozen toes and numb fingers, I picked up the sudden movement of a flickering tail through the thick underbrush about 40 yards outside of the plot. Then, the indiscernible object turned slightly to the right, and I clearly made out the shape of extra-long tines, a swollen neck and a massive body. The buck meticulously worked toward the edge of the opening before pausing and scanning the ambush plot for danger. There was no ground shrinkage from the trail cam pictures and videos of the remarkable buck. He was every bit as big as he looked on camera.

Suddenly, I felt a slight cold breeze hitting my facemask, which helped calm my nerves, because the wind was perfectly in my favor. The buck tilted his head back and scent-checked his surroundings while rotating his ears, trying to detect any sounds. He took a deep breath that pushed-out a large white plume in the frigid morning air, creating a scene straight out of every deer hunter's dream. His body language began to relax, and he started to enter the ambush plot, directly facing me at 25 yards. The deer fed eagerly with his nose to the ground for a minute or so, but it felt like an eternity. Then, he stretched and rotated his huge neck and head side to side before turning and walking steadily toward the mock scrape. By the time he stopped to work the overhanging licking branch, my arrow had

already been released and was speeding toward his vitals just behind the shoulder.

The glowing-orange lighted nock rapidly disappeared inside of the grayish-brown fur, and a loud swhack echoed across the confines of the thicket. Immediately, the buck jumped and mule-kicked before crashing through the dense underbrush and piling up about 50 or 60 yards to my right. An enormous weight was instantly lifted from me as I followed the bright-red trail of blood on the ground straight to the downed buck. No more sleepless nights worrying about a poacher spotlighting the giant 10-pointer or another hunter shooting him on the surrounding property. My gamble and calculated risk had paid off big-time on a heavily pressured, incredibly smart mountain whitetail.

HOW TO MAKE THIS STRATEGY WORK

Since that hunt, my son, father and I have used the same strategy to take hard-to-handle bucks that stick to the thick, nasty stuff during daylight. This technique takes extra planning and prep-work, but it produces results when other traditional tactics and setups fall short. The keys to pull off this strategy and setup are to run multiple trail cameras to find a shooter and piece together a complete daily pattern. You will need nonstop surveillance to pinpoint and monitor current feeding areas and the thickest nearby cover, along with travel corridors that connect those prime locations.

One of the most crucial steps after finding potential daytime sanctuaries is to use multiple trail cameras to figure out when and where a target buck is entering and exiting the location. After that's established, carefully scout the opposite side from those entry and exit points. It's crucial that you find possible hunting access points that are less likely to disturb and spook deer inside of their core daytime area. Every sanctuary will be a little different, but you'll want to find relatively flat ground with decent soil for planting a small ambush plot. This ground also needs to be close to where most of the deer bed during the day.

It's not a must, but I prefer to scout and do the prep work inside these highly sensitive areas during rainy or at least windy midday periods. As mentioned, this reduces the risk of contaminating the site with alarming scent and noise. You will want to leave adequate amounts of surrounding cover in and around the ambush plot, but open up the canopy as much as possible to maximize the amount of sunlight that can reach the ground. Use a handsaw or cutters to remove leafy overhanging limbs and weeds from the sections you plan to plant with a shade-tolerant, no-till food plot mix.

After that's completed, use a rake to clear the ground of leaves, sticks and other debris. It doesn't have to be perfect, but you want as much seed-to-dirt contact as possible. If you're dealing with poor soil conditions, it wouldn't hurt to add some Triple 10 or Triple 19 fertilizer and lime pellets. Next, use cedar, pine and other surrounding branches to construct a natural blind overlooking the ambush plot. If there are suitable trees within range of the ambush plot, try setting up a hang-on stand with ladder steps that will let you get up the tree much quieter than a standard climber.

In addition, I also recommend adding a

mock scrape inside of a cleared shooting lane from your ground blind or tree stand setup. Depending on your state's hunting rules and regulations, you can also add a mineral lick, corn or other attractants to create extra attraction. During extremely dry periods, I've even constructed small watering holes, which can be a game-changer. You will want to monitor the ambush plot and other attractants with a cell camera coupled with a solar panel or extra battery box to extend the life of the unit. The less you have to enter and disturb these highly-sensitive areas the better. In fact, when you've completed the prep work, it's a good idea to stay out of the setup until you have a shooter patterned and the right wind to hunt him.

Again, how you reach, hunt and exit your sanctuary setup can be the difference between success and failure. If needed, take the long way around or the harder route to avoid spooking and educating deer. Thoroughly clean out your trails with a rake and handsaw to silence your approach, and rely on your cell cam to make sure the coast is clear before entering to hunt. Backing away and waiting a few minutes for deer that are already feeding in the ambush plot to work their way out is always wise. With this type of setup, it's important to remember that whitetails will filter in and out of the small ambush plot throughout the day.

Why does this increased daytime activity occur within these secluded sanctuary setups? It's almost impossible for any deer to lock down on a bed hours before daylight and stay put until after dark. That would be torture. Pressured whitetails can develop nocturnal tendencies and patterns, but several recent studies have shown that they rarely stay completely nocturnal for extended periods. Deer will undoubtedly adjust their behavior and patterns to compensate for hunting pressure, but they're not going to be inactive all day. In most cases, mature bucks that have survived a few seasons will simply shy away from areas with minimal to no cover, such as agricultural fields and open, clean woods during the dangerous daylight hours. In these thick sanctuaries, they feel safe to ease off the bed, stretch their legs a little, browse on food and relieve themselves. This often happens many times throughout a typical day and even more during the right conditions.

CONCLUSION

With sanctuary setups, some of your best hunts will occur a few hours after daylight, and at midday and early afternoon. If you can slip into the area undetected and hunt the right wind, you will dramatically increase the amount of productive hunting time and observable daytime deer activity. It's amazing what you can accomplish when you're no longer just relying on the first hour or so after daybreak and the last few precious moments during late evening. Hunting this type of setup gives you those standard prime time periods and extended portions of the entire day, so you're maximizing your time in the stand and overall productivity. That's why you need to give it a try this season and make your own luck instead of waiting for something good to fall into your lap.

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CASEY CHRISTMAN:

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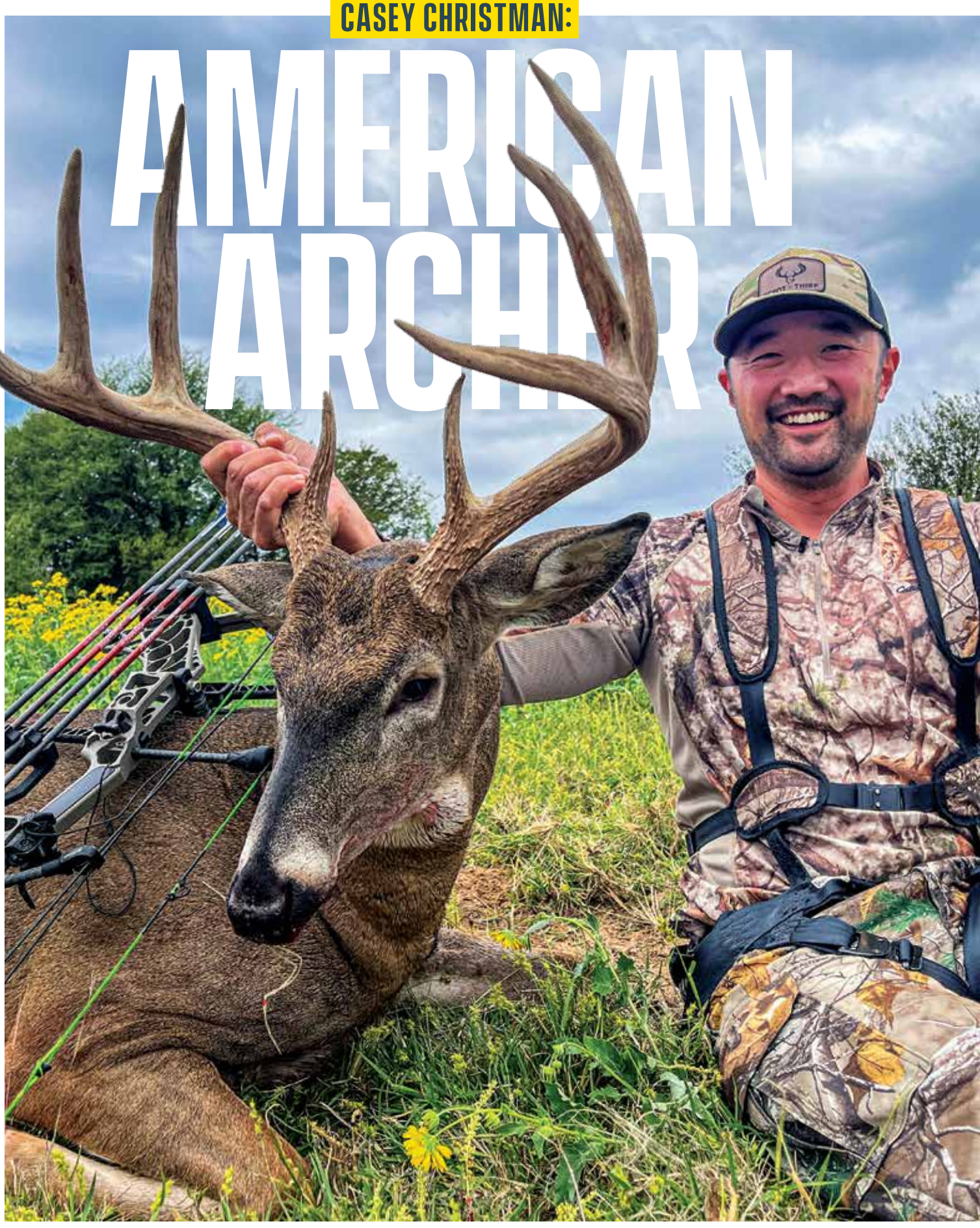


Co-host of the American Archer TV series, Casey Christman shares his passion for pursuing and managing America's No. 1 big-game animal.

By Gordy J. Krahn

Deer hunters typically fall into one of two distinct camps. The first takes a casual approach — a weekend or two at the cabin each fall with friends and family, or sneaking out for an evening on stand here and there after work. Such folks are weekend warriors who pursue whitetails when and where they can. And then there are those guys and gals who take hunting America's No. 1 big-game animal to incredible heights, with a determination that seems to exceed sensibility, traveling to all points on the compass to feed their love for hunting whitetails.

Casey Christman belongs to the latter camp, driven by a passion for bowhunting whitetails that has taken him across much of the Midwest for roughly the past 24 years — more so since 2016, when he became co-host of American Archer on the Outdoor Channel. This award-winning TV series features fair-chase hunts as well as segments on archery, with a mission to educate and entertain.

"White-tailed deer and bowhunting are my true passions in life," Christman said. "Every year, I dedicate most of my time to preparing for deer season and then pursuing them across several states in the Midwest."

Christman also manages the largest archery shooting facility in Michigan. Located at Michigan State University, the Demmer Shooting Sports and Education Center offers many archery opportunities, including indoor and outdoor ranges, along with instruction, TechnoHunt video archery and a full archery retail space.

"I spent roughly 16-½ years as a police officer, but was given the opportunity to change careers and have my passion for archery become a full-time job when I took over managing the Demmer facility in July of 2022," he said. "Our primary goal is to provide a safe and welcoming environment for archers of every skill level. One of our main focuses is on youth archers, and I believe we have one of the best junior Olympic archery development programs in the state and a S3DA (Scholastic 3-D Archery) team that can easily compete with any other team in the nation. Whether it's becoming a better target archer or bowhunter, our staff possess the knowledge base to assist anyone who walks through our doors."

Casey Christman, co-host of American Archer on the Outdoor Channel, says year-round forage is critical for holding deer in an area.

Christman credits preparation and lack of intrusion as the critical factors that let him take mature bucks.

But Christman's interaction with whitetails and love of archery goes beyond the hunt and the Demmer Center. Planting food plots and improving habitat has been part of that equation. The two-pronged goal is to have a healthy deer population and more and better hunting opportunities. "Over the past 10 years, my focus has shifted more toward habitat improvement and providing quality food sources for my local deer herds 365 days a year," he said.

To see what makes this whitetail wizard tick, we caught up with Christman during the off-season — if there is such an animal — and asked him to share his whitetail wisdom.

WI: Can you tell us about your hunting background and where you do most of your hunting?

Christman: I first started chasing whitetails in my home state of Michigan with a close friend, Aaron Hubbard, during high school. I initially hunted during shotgun season my first fall but quickly transitioned to archery the following year. To this day, I still spend a large amount of time in the Michigan deer woods scouting, planting food plots, building habitat and spending time on stand during fall. Many of the properties I have had access to over the years have come and gone, but each fall, I'm able to add a decent property or two by knocking on doors and getting to know people. I also have access to a few pieces owned by my wife's side of the family, where I spend my most time trying to manage and build the local herd. And since I started filming for American Archer, I began traveling to other states and hunting parcels owned by friends and outfitters.

WI: What drives your passion for hunting whitetails, and where did it come from?

Christman: An interaction with whitetails during my first hunt really set the hook. I was seated on the ground and had three does meander by 5 or so yards away, and they stopped to look at the out-of-place lump seated next to a bush (me). Watching them interact and their proximity to me that day created an obsession that seems to only get stronger as each year passes. I enjoy everything about the whitetail experience, from learning their natural movements and ways, to providing better habitat and quality food sources. Over the years, I have learned there is something to take away from every hunt. Each whitetail is an individual, and trying to figure out how to get close to mature deer continually drives me.

WI: How important is it to have the right archery equipment?

Christman: Every major manufacturer, for the most part, makes quality equipment. The most important advice I can give a new archer is, regardless of the price tag on your setup, make sure it is set up properly. At our shop, I see an absurd number of bows come through our doors that are set up completely wrong by other shops rushing to get them out the door. Several examples would be improper center shot and rest height, D-loops being too tight or too loose, no nock points tied in, improper cam timing and countless other factors. Consistency is key to repeatable accuracy, and an improperly set-up bow makes it extremely difficult to replicate consistent form and release.

WI: Talk about your philosophy regarding food plot and hunting stand strategies.

Christman: I always do my best to "plant" the stand, not plant a food plot then hope I can find a suitable tree to hang a stand on. I also am a strong believer in food plot architecture. Frequently, after I pick a stand location, I plant a plot in the shape of an L or B, because it can help dictate deer movement to a certain degree and create natural pinch points where they funnel to within a shorter distance from my stands. Another critical design feature I like to employ is planting rows of corn to break up plots. The corn provides an additional food source for the herd but also breaks up line of sight in the plot. The corn rows make it impossible for a buck to step into the plot and view everything while searching for does. I also do my best to plant food sources as far away from neighboring properties as possible. My logic is this: If deer are using my food plots during daylight, there's a higher probability they will not be walking around on the neighbor's ground during shooting light.

WI: How vital is proper land management when targeting mature whitetail bucks?

Christman: Providing year-round forage is critical to holding deer. Typically, I will have some type of early growing, high-protein, green forage such as Imperial Whitetail Clover or Imperial Whitetail Fusion on every property I have access to. And then I do my best to provide late-season forage as well, such as Beets & Greens, Tall Tine Tubers and Ravish Radish, particularly after the first heavy freeze has set in and my clover and Fusion go

dormant. Managing the land and creating different types of cover that the herd can use throughout the entire year is another major factor. Creating summer and winter bedding areas greatly increases the chances of holding deer on a specific property throughout the year.

WI: How do Whitetail Institute products play a part in your food plot strategy?

Christman: The Whitetail Institute products I use are important when it comes to successfully holding and harvesting mature deer. I use a wide variety of the product line to provide cover and year-round forage for my local herd. I almost always plant one or two plots on each property using an early growing green source, such as Imperial Whitetail Clover or Fusion. Both green up early and provide a tremendous high-quality protein food source for the deer after a cold winter. I typically add brassicas adjacent to the clover and Fusion for a green-to-green transition after the first heavy frosts. I've personally witnessed the green portions of the Beets & Greens, Tall Tine Tubers and Ravish Radish being devoured throughout the early season. As the first frosts set in and row crops are being harvested, attention turns to the bulb portion of these types of plots. And recently, I have also begun using Conceal as bedding cover and planting narrow rows for stand entry and exit.

WI: What are the critical factors that account for your success when it comes to killing mature bucks?

Christman: Preparation and lack of intrusion. I'm a huge believer in using trail cameras to collect data at hunting locations when I know a specific buck is using that area. The intrusion portion is critical, because if a mature buck knows it's being hunted, the odds are most likely against you, short of a doe in heat pulling him by a stand. I also should point out it's not always me doing the scouting and trail camera data collection. Because of filming and traveling to so many locations each fall, I rely heavily on several like-minded outfitters to do the homework for me. There is nothing I enjoy more than the preparation, scouting and time afield collecting information on a specific deer on my own, but it's literally impossible for me to do so across so many states and locations.

WHITETAIL CANDY

Whitetails are foodies. They crave and seek out a wide variety of nature's delicacies to fill their stomachs and satiate their sweet tooth with nutrient-rich foodstuffs that keep them fat and happy. Savvy whitetail hunters know this. They also know that providing a smorgasbord of desirable foods will keep deer on their properties. And that's why of the Whitetail Institute products Casey Christman uses to fortify his food plots, two stand out as go-to plantings.

"I can't say that I have a single favorite Whitetail Institute product, but if I had to choose two, they would be Imperial Whitetail Clover and Beets & Greens," he said. "Both yield a freakish amount of forage, and when planted in proximity, provide nearly 365 days of food for the herd."

Imperial Whitetail Clover is a perennial that contains the only clover genetically designed specifically for white-tailed deer. It has an extremely high protein content critical for antler, muscle and bone growth, and thrives in extreme cold as well as warm, dry climates. Deer love its taste and will travel long distances to feed on it. It's coated with RainBond for enhanced seedling survivability and lasts up to five years from one planting.

Whitetail Institute Beets & Greens is a blend of annual seed varieties — kale, turnips and radish varieties, as well as the sweet attractiveness of sugar beets — designed to work together to attract and hold deer. These components are present in ratios that Whitetail Institute testing has proven will provide abundant, highly attractive tonnage from early fall through late winter, as well as tubers to help deer through the harsh winter months. Designed for planting in fall, Beets & Greens establishes and grows quickly.

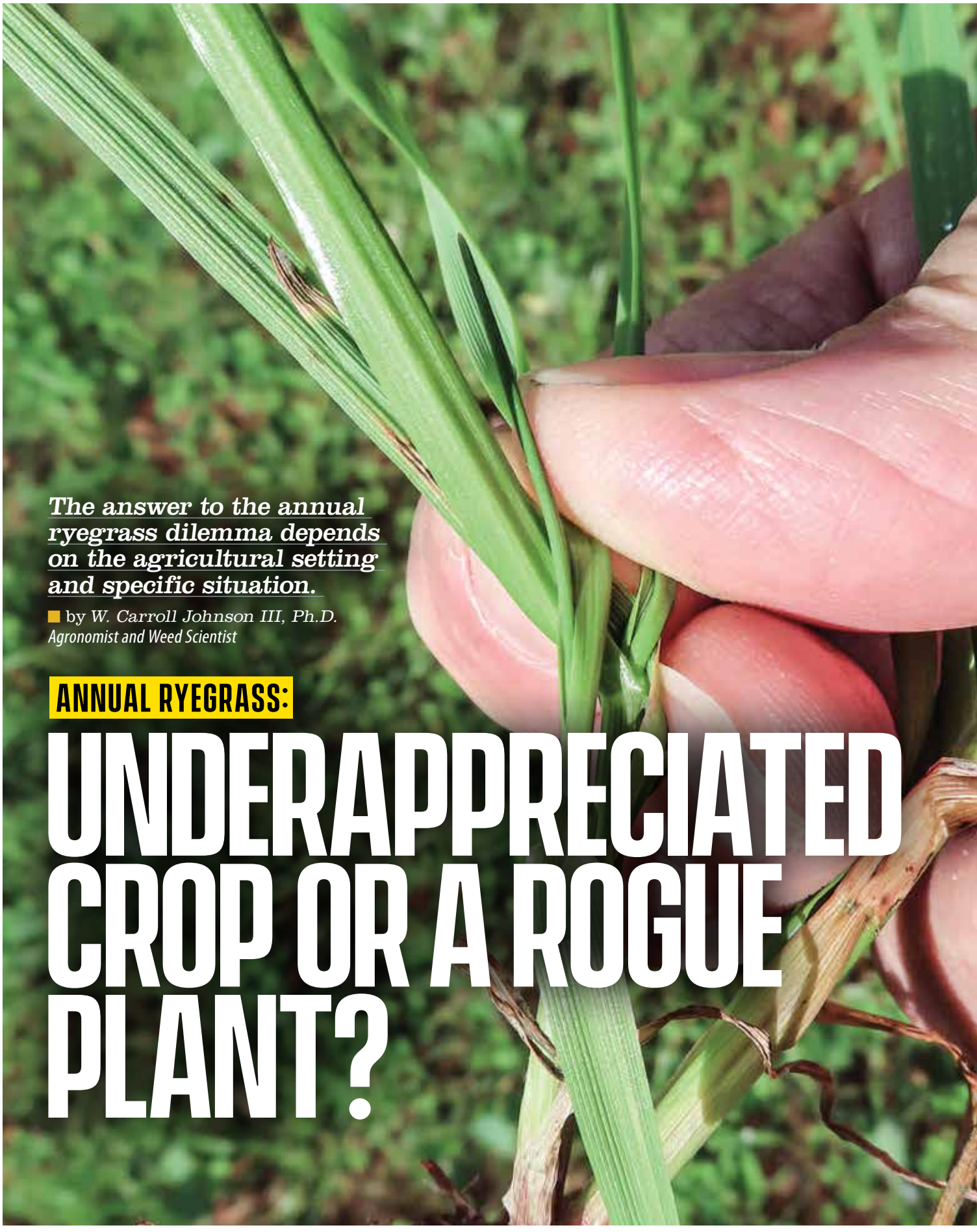
For information on these and other Whitetail Institute products, visit ***www.whitetailinstitute.com****.*

WI: Is there a buck that stands out as your most memorable?

Christman: My most memorable buck is nowhere near my largest and was taken well before I started filming for the show. It was my last year in college, and I spent hundreds of hours scouting and monitoring a small 100-acre piece I had gained permission on. It was the evening of Nov. 3, and I was seated insanely high in a tree facing to the south. As light began to fade, I could see antlers moving through tall switchgrass near the southern property line. I rattled, grunted and tossed out a snort-wheeze, and the tall-antlered buck turned and began slowly walking in my direction. The buck stopped around 150 yards away and absolutely destroyed a small pine tree, violently rubbing his antlers up and down. I snort-wheezed again, and he looked up, made a scrape and began his slow walk directly toward me. He eventually walked within range and turned broadside at 38 yards. I let an arrow go, and it found its mark. The buck ran south and fell roughly 120 yards away. He was my first Pope and Young-caliber whitetail and taped out at 136-6/8 inches. Between the setting sun, calling him in and the show he put on as he slowly approached, I could not have asked for a more memorable hunt. I vividly remember thinking to myself, "Wow, that was incredible. That was just like what you see on the TV shows." The following year, I purchased my first camera and started self-filming.

WI: What's on the horizon for you as we look forward to the Fall 2024?

Christman: I will be kicking things off in Kentucky and returning to Oklahoma and Illinois. I will also be spending time on stand in Ohio, and possibly Maryland, Wisconsin and Iowa. Obviously, I will be spending time preparing, scouting and hunting my home state of Michigan. Chasing whitetails is my passion, and getting to share my experiences and what I have learned afield with so many other hunters is truly a blessing. Best of luck to everyone afield this fall, and shoot straight.



The answer to the annual ryegrass dilemma depends on the agricultural setting and specific situation.

by *W. Carroll Johnson III, Ph.D.*
Agronomist and Weed Scientist

ANNUAL RYEGRASS:

UNDERAPPRECIATED CROP OR A ROGUE PLANT?

■ Annual ryegrass is a bunch-type forage grass that quickly produces an extensive root system. A critical identification characteristic is the presence of clasping auricles, which are small transparant tissues from a leaf blade that wrap around the stem.

As a plant, annual ryegrass is an enigma — difficult to understand, with a seemingly conflicting role.

Annual ryegrass is commonly planted as a forage in the southeastern United States for cool-season grazing by livestock. The same species is also overseeded on residential lawns and athletic fields to provide an attractive turfgrass when the perennial sod is dormant during winter. In addition, annual ryegrass is hydroseeded in erodible construction sites to stabilize soil. On the other hand, annual ryegrass is a troublesome weed of cereal grains such as wheat.

It's logical to ask: Is annual ryegrass a desirable crop or a weed? The answer depends on the agricultural setting and the individual situation. In food plots, the enigmatic nature of annual ryegrass is equally conflicting.

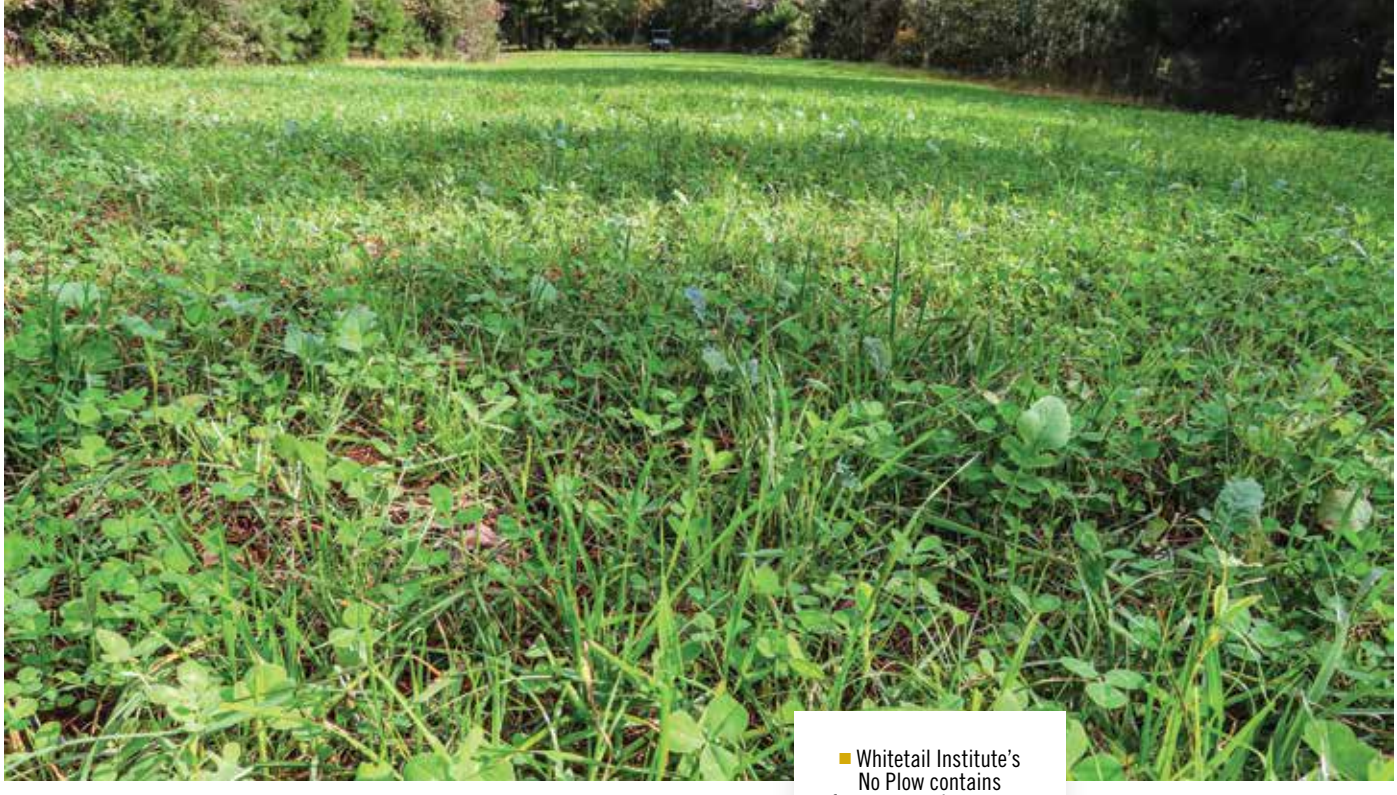
ANNUAL RYEGRASS. THE PLANT

Annual ryegrass (*Lolium perenne*, subspecies *multiflorum*) originated in southern Europe, and that history is the basis for an alternate name — Italian ryegrass. As the name suggests, annual ryegrass typically lives as an annual, although it might survive as a weak perennial for a few years. Perennial ryegrass (*Lolium perenne*) is a different plant that's a true perennial pasture grass commonly planted in northern latitudes, but it's not as cold tolerant as other pasture grasses, such as timothy and orchardgrass. Annual ryegrass seeds germinate seven to ten days after planting, and seedlings quickly develop an extensive fibrous root system, which is the basis for the plant's resilience and extreme competitiveness with other plants. Individual annual ryegrass plants grow in clumps and do not produce runners to fill adjacent voids. Leaves generally reach around 8 to 12 inches long. Foliage of well-fertilized ryegrass has a lustrous green color, except for the bases of plants, which are yellowish-green. Seedheads normally first appear in spring, depending on geographical location.

ANNUAL RYEGRASS. THE CROP

Annual ryegrass has four distinct use patterns: forage crop, soil conservation tool, short-term turfgrass and cover crop in conservation tillage cropping systems. Significant plant breeding efforts have refined annual ryegrass varieties grown specifically for forage. Forage varieties are continually being improved for yield, nutritional content and cold weather tolerance. The annual ryegrass varieties included in Whitetail Institute seed products are proven forage varieties and highly nutritious. Turf varieties of annual ryegrass should not be planted in food plots because they are low growing and not developed with adequate nutritional content for forage use.

Annual ryegrass grown for forage is a major crop in the United States, with almost 2.5 million acres, 90 percent of which is in the southern part of the country. Australia, New Zealand and European countries have significant acreages planted to annual ryegrass for temporary grazing by livestock. Accordingly, a significant portion of the forage seed industry is committed to improving annual ryegrass varieties. Many land-grant universities conduct scientific experiments that test the yield and nutritional characteristics of annual ryegrass varieties grown for forage. As a result, annual ryegrass forage varieties provide an excellent high-quality herbage that establishes rapidly, reliably produces good yields and provides nutritious forage to grazing animals. From an agronomic point of view, annual ryegrass is a consistent and reliable livestock forage, and that benefit directly applies to food plots. The nutritional content of the forage is an underappreciated attribute of annual ryegrass in food plots. The keys to capitalizing on the nutritional value of annual ryegrass are to: 1) Choose an annual ryegrass variety developed for



■ Whitetail Institute's No Plow contains forage annual ryegrass, brassicas and several species of annual clover.

forage use that has a high nutritional content; 2) fertilize with nitrogen according to soil test recommendations to maximize protein content; and 3) understand that annual ryegrass is more nutritious and palatable at the vegetative stage of growth before seedhead production. When properly managed, annual ryegrass for forage has dry matter digestibility values of greater than 70 percent, approaching and sometimes exceeding 80 percent with young plants early in the season. Further, the protein content of annual ryegrass forage typically ranges from 10 to 15 percent, and if the leaf tips are browsed, protein levels are occasionally greater than 30 percent. These attributes make annual ryegrass a useful forage in food plots.

Annual ryegrass is also a valuable crop in food plot management because of its versatility. It's commonly recommended for use as a quickly emerging component in a forage species seed blend during pasture establishment. Adding annual ryegrass to a seed mixture with a legume and a perennial grass species will provide rapid growth and high-quality forage during the first year.

In the food plot context, annual ryegrass in products such as No Plow is the first species to emerge and establish, with other species in the mix soon following. The presence of annual ryegrass will attract deer and absorb early season grazing pressure, allowing the other forage components to establish later.

FOOD PLOT USES

Three Whitetail Institute products contain annual ryegrass: No Plow, BowStand and Secret Spot. The food plot niche for these seed products makes annual ryegrass an ideal component. Annual ryegrass is easy to establish in food plots during conditions where a finely prepared seedbed is difficult to achieve, but it will also thrive when first-rate seedbeds are prepared. Further, the nutritional value of annual ryegrass is excellent. Granted, the nutritional value of annual ryegrass is not as good as other food plot forages, such as clover and alfalfa. However, when food plot management calls for quickly establishing a food plot, or circumstances arise when there is inadequate time to meticulously prepare a seedbed using multiple tillage operations, any of these annual ryegrass-containing seed products are good choices for your back-up plan.

ANNUAL RYEGRASS AS A WEED

As mentioned, there are situations where annual ryegrass is considered a weed, meaning it causes losses in crops because of competition. That situation is not unique to annual ryegrass. I can cite several examples and have first-hand experience with previously planted crops that later act as weeds. That twist of fate happens in commercial agriculture as well as food plots. Annual ryegrass is a prolific seed producer, and short-term seed longevity in the soil can cause problems in the near future when various food plot forages are planted. To be clear, annual ryegrass as a weed is not impossible to control. Arrest Max will control annual ryegrass in any broadleaf forage, including clover, alfalfa, chicory, forbs and all brassicas.

PERSPECTIVE

I read online magazines, listen to podcasts and occasionally speed-read Internet forums related to food plots. Everybody has an opinion about annual ryegrass as a deer forage in food plots. Discussions are spirited, to say the least. Some of the discussion is factual, and some is simply opinionated noise with no real scientific basis. Consider the scientific facts presented here: 1) Forage varieties of annual ryegrass are reliable producers of nutritious forage that have a niche in many food plot systems, including a role in a back-up plan contingency, when time constraints are unavoidable. 2) If volunteer annual ryegrass is a problem weed in future crops, it can be controlled with Arrest Max.

Annual ryegrass might not be your No. 1 choice for a food plot, but this proven forage is a reliable and effective option when needed.

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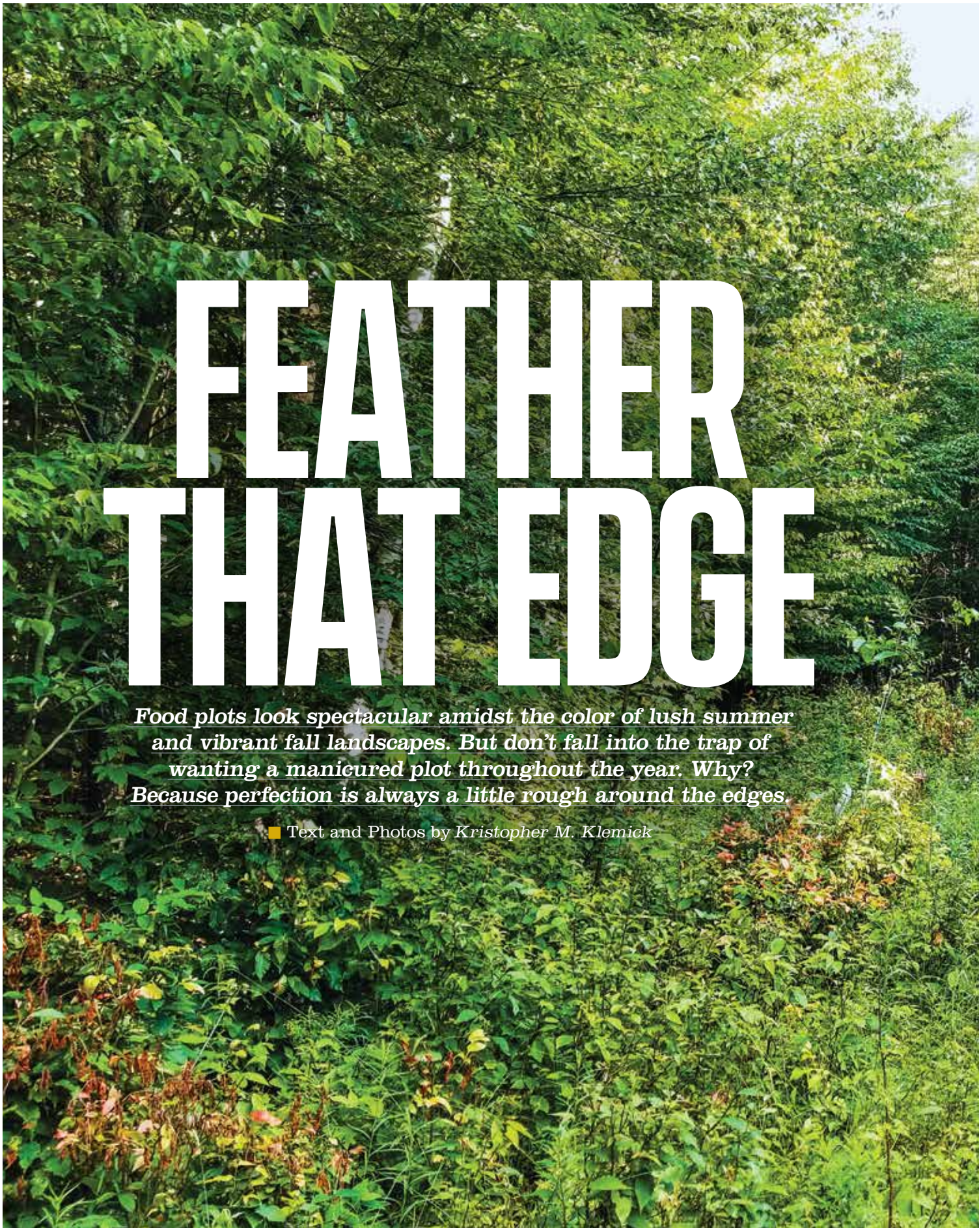
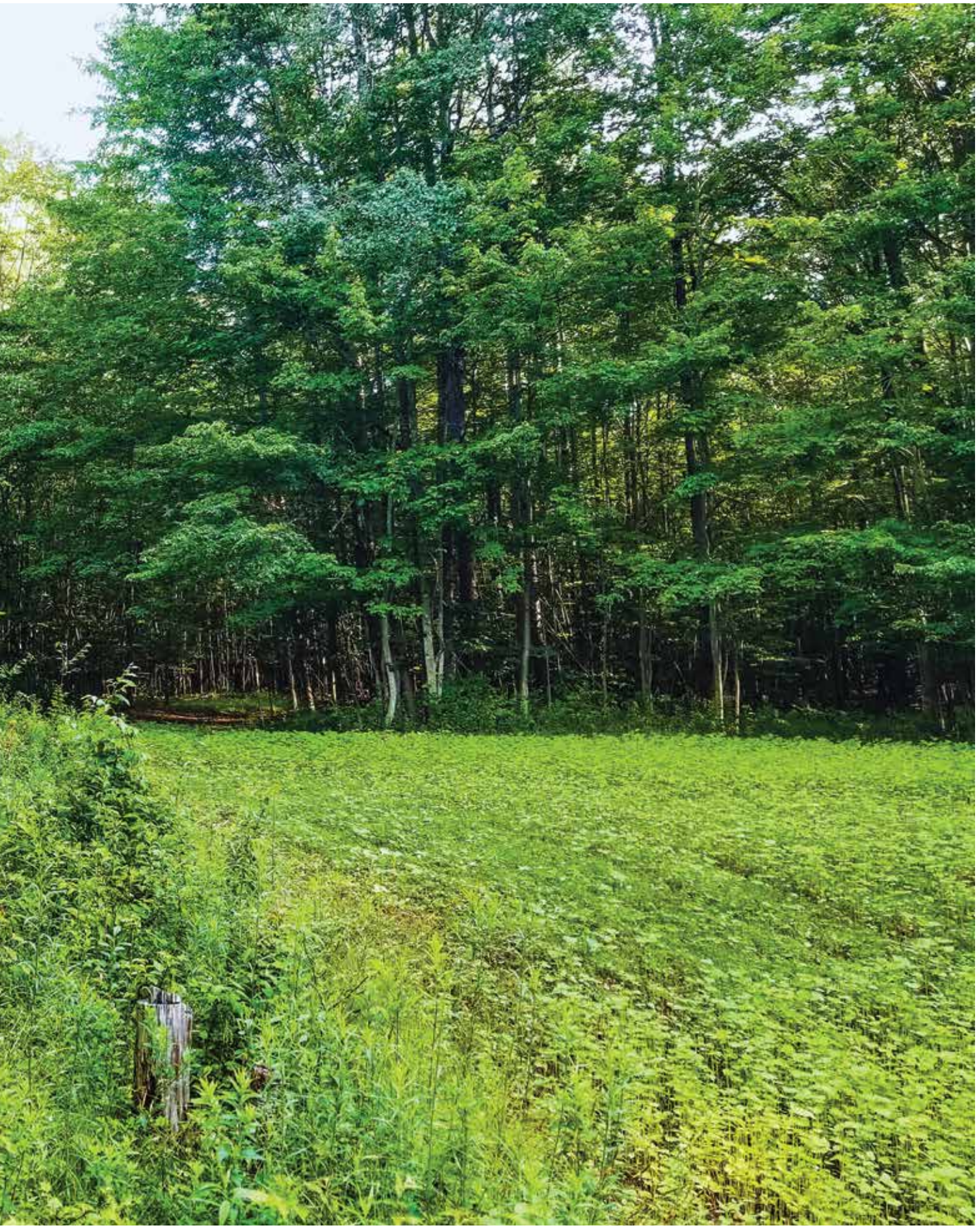


FEATHER THAT EDGE

Food plots look spectacular amidst the color of lush summer and vibrant fall landscapes. But don't fall into the trap of wanting a manicured plot throughout the year. Why? Because perfection is always a little rough around the edges.

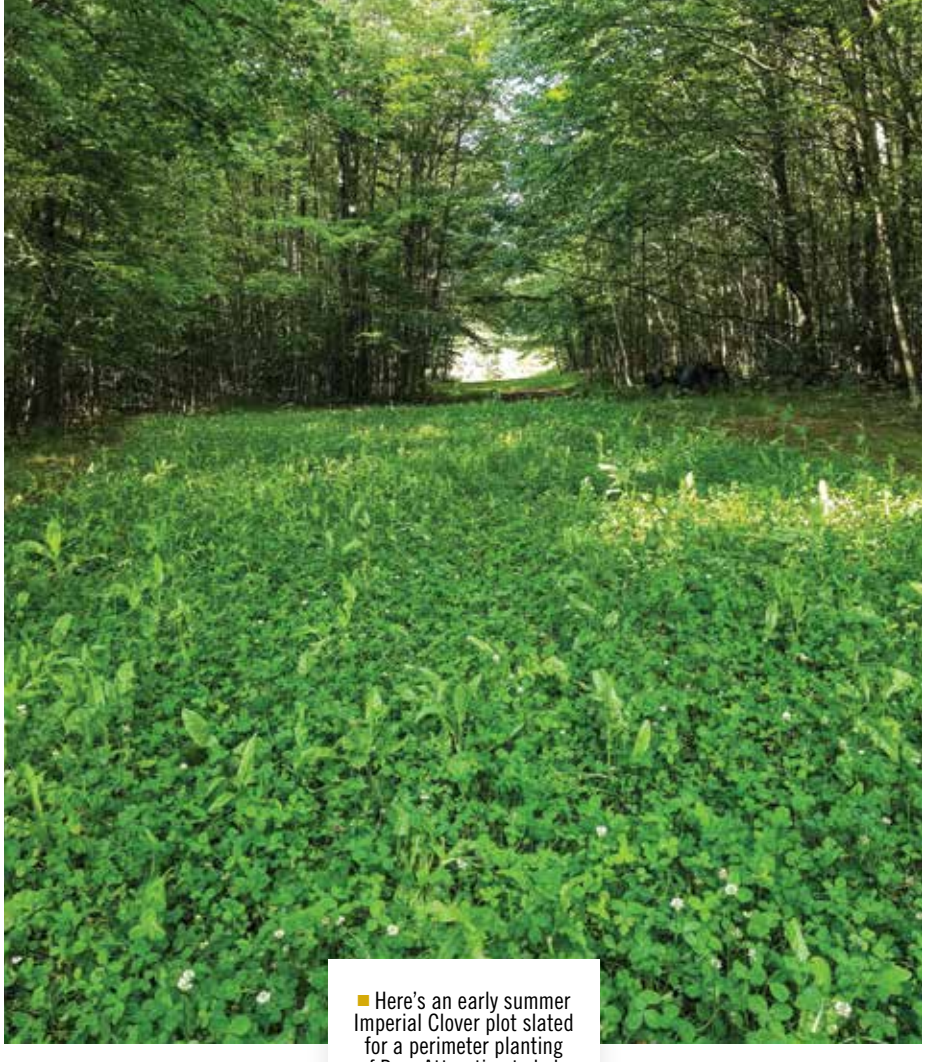
Text and Photos by *Kristopher M. Klemick*



Whitetail Institute food plots are a powerhouse ace in the hole, especially when the odds are stacked against you. Perhaps you're surrounded by agricultural fields where deer have more food "croptions" than they know what to do with. Or maybe you're in the middle of endless acres of vast forest, and there isn't an oak tree or food plot for miles.

At first, it's easy to associate the perception of a healthy, beautiful plot with that of a homeowner's healthy landscape. Take notice on your way home from work, as you drive to the store or as you enjoy a leisurely stroll through your neighborhood. I'll bet you see more impeccably manicured and well-kept front yards than the number of deer you encountered the last time you were afield.

But planting and maintaining healthy plots seems to go against notions of keeping up with the Jones' landscaping. There should be no well-discerned lines and no crisp edges where grass meets mulch. Simply, fancy fanfare has no place in food plots. Save the letters and phone calls concerning overgrown weeds for the homeowner's association inspector.



■ Here's an early summer Imperial Clover plot slated for a perimeter planting of Pure Attraction to help build an edge.

WHY THE EDGE?

Most food plots are situated across the landscape to make the most of plantable acreage. Seeds are sown and the forage grows as close as possible to natural and manmade barriers as we attempt to produce the biggest yields for deer. Unfortunately, in doing so, the average food plot lacks an important component — a transition zone out of the plot and into the adjoining forest or field. Deer typically avoid open spaces during daylight, especially across high-traffic, heavily pressured landscapes. As a result, deer use plots mostly during darkness, when they can enter them without fear for their safety. There's no reason for them to feed or travel in areas where their safety is compromised.

In a recent discussion with Whitetail Institute General Manager William Cousins, he talked about how a food plot edge is to deer what the front door and lobby of our favorite restaurant is to people. There's comfort in being there. It's a place where deer feel safe, knowing there's cover surrounding the buffet they're about to enjoy. If alerted to danger, they can take a few short bounds, and their whereabouts are indiscernible to an approaching predator.

BUILDING A BUFFER

Creating or incorporating a transition zone or buffer between your food plots and the surrounding landscape is relatively easily and pays dividends through time, so you'd be wise to build them into your overall strategy. If your food plot footprint is limited — and especially if it's carved out of the woods — I know the idea of giving up precious plantable soil for escape cover can seem unnerving, but hear me out.

Food plot transition zones only need to be as wide as you're willing to make them, but a general rule holds that bigger is better, and anything is better than nothing. Although a wall of 5- to 10-foot cover is acceptable, a strip three times wider (15 to 30 feet) significantly reduces visibility beyond the food plot, thereby increasing the plot's overall desirability and productivity during daylight. And depending on the lay of your land, several transition options exist. Let's explore a few to help determine which might work best in your situation.

Abandoned farm fields from a bygone era are magical, but these areas have often entered latter seral stages and offer limited benefits to white-tailed deer. Prescribed fire or disking the field, however, can help facilitate compositional change back to early successional habitat, which can be thought of as the youngest generation of greens within the plant community at a site — one that's rich in annual and perennial forbs, grasses and brambles. Such forage diversity accounts for almost 70 percent of a deer's diet in spring and summer, not to mention the cover it provides. Leaving the outer perimeter of this newly rejuvenated farm field to itself and planting your food plot inside its footprint can be one way to accomplish the transition zone in a natural manner.

Plots carved out of areas surrounded by forest, like the ones pictured in this

■ With appropriate soil conditions, Conceal produces a thick, fast-growing wall up to 8 feet tall or higher that is visually impenetrable and perfect for bedding and cover.

article, can also be enveloped in a natural edge of native forage. If the plot is in the (de)construction phase — anything from chainsaws to pruning shears — remind yourself not to clearcut right to the outer perimeter. Sure, you want to remove trees, turn dirt and plant, but give the perimeter a free pass. The area will quickly begin its rejuvenation process, as shown in the left portion of the photo on pages 48 and 49. It's easy to see which side offers wildlife the best security, and in a plot that's less than a quarter acre, giving up what could have been years of Winter Greens, Tall Tine Tubers and Imperial Clover production in lieu of a transition zone is a tough, albeit necessary pill to swallow.

On the other side of the plot, where there's no transition, Whitetail Institute has you covered with a one-two punch to take your plot over the top. If cover is your ultimate goal, Conceal is your best friend. With appropriate soil conditions, this annual seed produces a thick, fast-growing wall up to 8 feet tall or higher that is visually impenetrable and perfect for bedding and cover. The barrier doubles as a stealthy way to access and back out of stands without alerting deer to your movement. Conceal truly lives up to its name.

Whitetail Institute's Pure Attraction also offers the advantage of thick cover — though not to the height of Conceal — while also serving as an exceptional food source. When planted around the perimeter of a lower standing plot such as Imperial Whitetail Clover, Pure Attraction offers a taller, denser transition into the surrounding landscape.

Integrating transition zones into food plots isn't always free of challenges though. By default or design, plots are often incredibly narrow, and your ability to feather the edges is limited. A chainsaw could make short work of opening a perimeter, but these funnel plots are deadly in fall with archery tackle, especially if you use traditional equipment. In this example, raking up the surface and spreading seed and fertilizer beyond the edge of the plot can help. You won't always obtain a solid transition zone, but you will provide a little extra boost to help build as much edge as possible.

ENHANCING OPPORTUNITY

Whitetail Institute offers a great selection of transition seeds, as well as enhancement products such as Impact to help when your soil health isn't quite at the optimal level it should be. Impact is a water-soluble product that quickly and easily raises soil pH, giving food plots and transition zones a much-needed nutrient boost when granular lime isn't an option. Of course, the best product to start with is always a soil test, so be sure that's the first thing on your list.

Ultimately, knowing the importance of cover and how deer use it in everything they do — including transition zones in and around your food plots — is one of the most productive enhancements you can make to increase your odds of encountering the buck of your dreams this season.

■ Jason Say's giant 2022 buck proved the value of wireless cams, which help him take inventory of bucks in his area and identify the best times and conditions to hunt them.

OUT-OF-THE-GATE BUCKS

Waiting for the rut to chase a mature buck? This expert thinks you're making a mistake. His early season food plot and trail camera strategies might put you on the deer of a lifetime.

■ by *Scott Bestul*

PHOTO BY JASON SAY

Jason Say was set to take his wife hunting when the Pennsylvania archery season opened this past fall. Then his Moultrie Mobile Edge trail cam starting blowing up his phone. "Up to that point, I really didn't have a buck I was excited about on trail cam, so I asked my wife, Liza, who likes to hunt when it's warm, if she wanted to hunt the opener together," Say said. "So we were set to do that when, three days before the opener, I start getting pics of a definite shooter — an obviously mature buck on one of my food plots. The first day, he showed up at 7:15 p.m., well before shooting hours ended. The next day, he was maybe five minutes later. So I said to Liza, 'If he does that one more time, I really feel I need to get in there and hunt that deer. She said, 'Go for it.'"

On the third night, the buck was right on schedule. The fourth afternoon, Say set up in a tripod stand at the food plot.

"A doe or two came in, and then another mature buck — not the one that had been on camera — fed into the plot, and it was a deer I would have been happy to shoot," Say said. "So I'm waiting for a good shot angle on that buck when I see another deer coming into the plot — the very buck I'd come in there to hunt. He walked in, and I made a perfect shot. My season was literally over in a couple of hours."

If you're tempted to believe that Say's early season success was a lightning strike, guess again.

"I've tagged four of my last five bucks in the first week of the Pennsylvania archery season," he said. "And I was almost five for five. In the 2022 season, I hit a giant buck high on the shoulder opening weekend, and he survived the wound. I was able to take that buck — a 167-inch monster — during the rifle season after I devoted the rest of my season to hunting that buck only."

Needless to say, Say is a firm believer in getting after bucks early in the season, and food plots play a critical role in that success. Although many of us count on food plots to provide nutrition and attraction to deer later in fall, when other food sources disappear or aren't as attractive, Say insists that hunters who don't focus on food plots early in the year can miss outstanding action. Here's a look at how he incorporates food plots into his early season hunting plan.

THE EARLY SEASON EDGE

Of course, every deer hunter knows the power of the annual rut and the exciting encounters it can provide. In fact, many whitetailers forgo early season hunts and put all their proverbial eggs in a late-October, early-November basket. Say gets that, but he also thinks there's no better time to target a specific buck than the first few weeks of the season.

"Let's face it, while the rut can be exciting, you're placing a lot of your hopes on Lady Luck," he said. "Also, since bucks are running bigger, your neighbor has as good of a chance of killing the buck you're targeting as you do. Early in the season, a buck's world is pretty small, and if you get the right food plots in the right places, you can make it even smaller, which only increases your odds of killing that deer."

There are more reasons to love the early hunt, according to Say.

"Probably the biggest is that bucks — even mature animals — are pretty relaxed then," he said. "They haven't dealt with hunters for several months and are far more likely to appear on food plots and trails well before dark. Once they've had some encounters with other hunters, that can all change pretty drastically. As an example, I once had my target buck show up on my food plot, and he busted me and ran off. I figured I'd have to rest the plot for a few days until he calmed down again. But my Moultrie cams showed me he was on that plot the very next day, still during shooting hours. So I went right back in and killed him."

Warm temps are a well-known kiss of death for deer movement, but they're less of an issue during the early season. Remember, whitetails are still wearing the thinner summer coats they've had for the previous several months, and Say has noticed the thermometer has less of an effect on deer in early fall.

"I've had several mature bucks hitting food plots with plenty of shooting light left," he said. "And the temps can be in the mid-80s. Warm temps simply aren't a big deal in the first weeks of the season, before deer get the coat that sees them through the winter."

PLOT CONSTRUCTION AND LOCATION

Setting up plots for early season success depends on several factors, but prime among them is location.

"The main property I hunt is actually ideal for me, as surrounding properties have big destination plots of corn and soybean fields," Say said. "Fortunately, I have all the cover, and to me that's perfect, as cover is the hardest thing to create. All I have to do is carve out some small plots adjacent to thick security cover, and bucks not only feel safe hitting them in daylight, but they've often moved off to the destination plots when shooting hours end."

Say said he has two main concerns when he's establishing a new plot. "No. 1 is how am I going to get in and out of here without spooking deer?" he said. "And No. 2 is how am I going to hunt it? I'm looking for a good tree to hang a stand from or the perfect place for a ground blind. These are hunting plots, so I'm most concerned with how to hunt them well."

When he's settled on a location, Say goes to work, often with modest tools.

"I'm typically creating plots as small as ⅛ acre and not larger than a half-acre," he said. "Ninety percent of them I create with nothing more than an ATV and a chisel plow. I look for an area with the start of an opening and just figure out how I'm going to enlarge it enough to create a food plot. When I have those questions answered, I go to work and, of course, do the necessary soil tests and add lime and fertilizer according to recommendations."

Say is a big believer in offering diverse options when planting.

"Not only does this give the deer a variety of options for eating, it can protect me when some plots fail," he said. "Last year, for example, we had so much rain that my brassica plots really struggled, but my clover/Fusion plots were outstanding. Having a variety of options is good for me and the deer."

Readers of this magazine are likely familiar with frost seeding, and you'd have to search hard to find a bigger proponent of that than Say.

"It's a perfect way to extend the life of a perennial plot but also start the process of converting an annual plot to a perennial," he said. "I also pay a lot of attention to my plots during sp ring and early summer, so I can control weeds with Arrest Max and Slay, as well as be ready to mow at the optimum times to maintain perennial plots at their optimum palatability."

CAMERA PLAN

An integral part of Say's early season strategy involves using wireless cams, which help him take inventory of bucks in his area and identify the best times and conditions to hunt them.

"I start an inventory about the end of June or early July by putting corn out and hanging cameras on those spots," he said. "It's legal to do that here in Pennsylvania, as long as you stop 30 days before the season. My corn piles are on my food plot edges, and I've found it's such a powerful draw that between the corn and food plot itself, a buck will often adopt that area as his core."

After corning season is finished, Say relies on his Moultrie Mobile cameras for long-term surveillance and up-to-the-minute reports on bucks.

"I run 13 cameras on my main hunting property, and they've been a total game changer for me," he said. "Before wireless cams, I did a lot of guessing about where bucks were and what they were doing. Now I actually know, and I can formulate hunting plans that are much more successful. I used to be fearful of being too aggressive early in the season, but my cameras have helped me conquer that fear. If I'm getting pics of a buck hitting a plot in daylight and I've got a good stand or blind for hunting him, I'm going in after that buck."

Say's giant 2022 buck proved the value of wireless cams.

"I hit that buck the first week of the season, and I knew the arrow was high and forward," he said. "I literally spent days looking for that buck and finally had to give up. When he showed up on camera again, it was such a relief. Not only did I know he was alive and well, but I could get back in the saddle and figure out a plan for hunting him. It took tons of stand time and a singular purpose, but I was not going to quit until I tagged him or the season closed. Fortunately, I was able to kill him, and I have cameras to at least partially credit for that. They kept me in the game and gave me the hope I needed to remain optimistic."

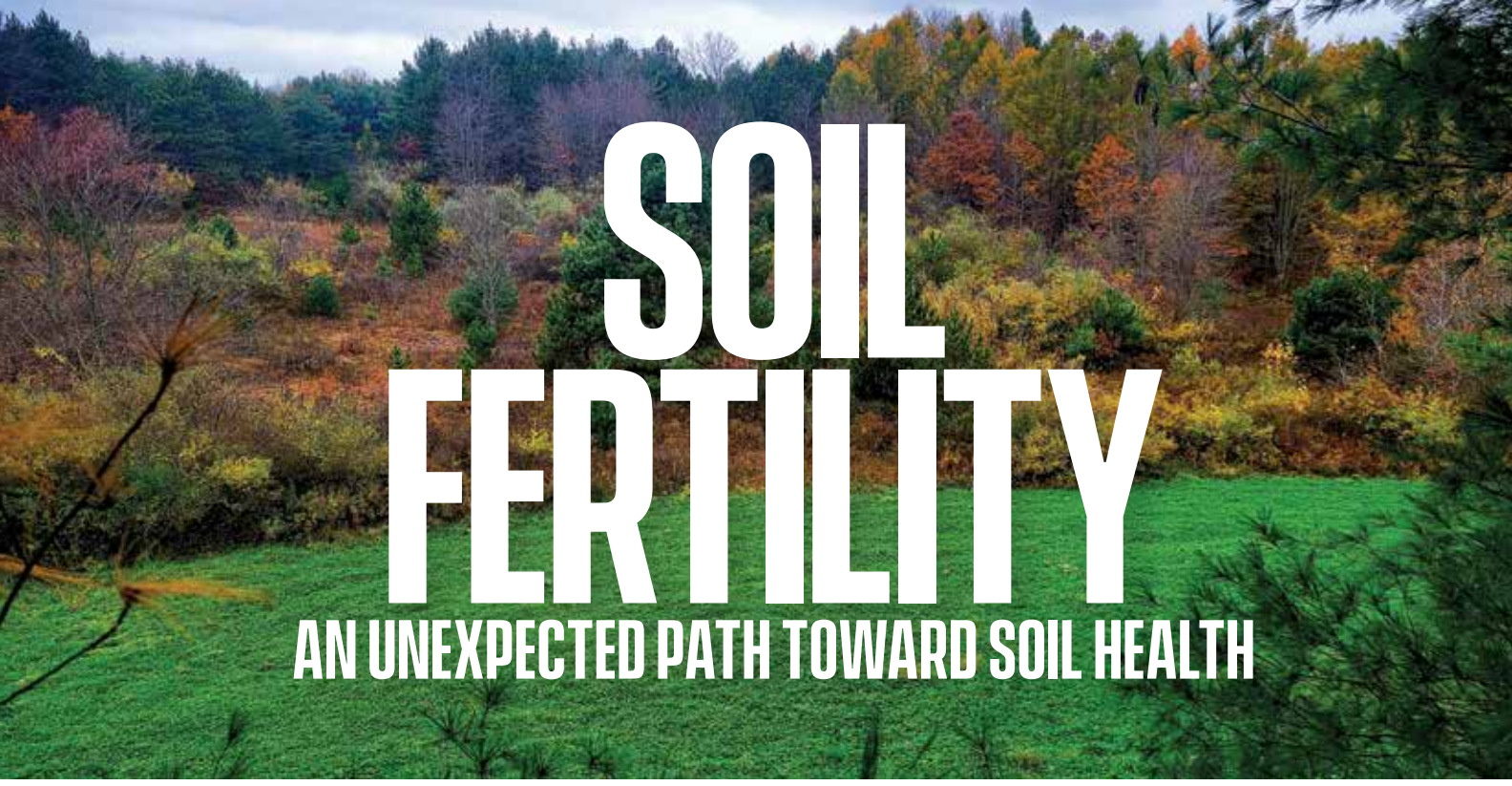
CONCLUSION

Like every other part of managing and hunting deer, success on early season food plots is no silver bullet.

"I've made plenty of mistakes over the years," Say said, including food plots he placed 100 yards from where he should have put them. "The deer eventually taught me I'd made a mistake. And it's important to remember that you might be introducing a food source the deer might not recognize. If you've never planted a brassica, for example, deer might ignore it because they don't know what it is. I've literally had to train deer to dig into some plot varieties, and that process can take a season or two sometimes."

But the result, as Say's track record on early season bucks proves, is worth any extra effort.

"I tell everyone it's important to have realistic expectations, no matter what kind of plot you're planting or management effort you attempt," he said. "But when you can shrink a buck's core area and use cameras to monitor the conditions when he likes to move, your chances of tagging a mature early season buck really soar. Focusing on those first few weeks has resulted in some of my best deer and totally changed the way I view the deer season."



SOIL FERTILITY

AN UNEXPECTED PATH TOWARD SOIL HEALTH

Consistent management supported by routine testing can be a long-term investment in your land and the ecosystem it supports. Auburn University has 113 years of research data to prove that point.

by *Anna Johnson*

In recent years, soil health and quality have been brought to the attention of the public in popular press and media.

Attention to soil health has basically coincided with increased recognition from government agencies and advocacy groups. Naturally, hunters have begun to express interest in soil health and how it can relate to food plot management. As a soil scientist, this uptick in interest is exciting.

Soil is not just the medium in which you grow crops. It's a complex living ecosystem with billions of microorganisms occupying one handful of soil. This newfound attention has also brought sensationalized information and claims, in addition to an influx of products marketed for soil health. The abundance of information and products can be overwhelming to the public. However, soil health and sustainability does not necessarily mean a complicated food plot management system. In many cases, vigilant soil fertility and pH management will suffice.

TESTING, PH MANAGEMENT AND MORE

The importance of soil testing cannot be overstated. Annual pre-plant soil testing provides growers with science-backed fertility and liming guidance that can help them sufficiently nourish their crops and achieve their goals. When crops have nutrient requirements met, growers will have a more robust, nutritious forage stand. Above-ground plant growth corresponds with enhanced below-ground root growth and the return of decomposing crop residue to the soil, which can through time increase soil organic matter — one of the most notable soil health indicators.

Many soil health indicators are connected and thus influence other parameters. For example, soil organic matter can improve nutrient availability and retention because the chemical structure of organic matter allows the soil to retain certain plant nutrients, including calcium, magnesium, potassium and ammonium. That allows such nutrients to remain in the soil rather than potentially leaching away with water as part of the soil solution. The chemical structure of organic matter also promotes soil aggregation, which can improve soil structure, water holding capacity and aeration. Such improvements in physical soil health indicators can make the soil easier to work with, improve root penetration and provide a habitat for soil organisms. Organic matter also serves as an energy source for soil microorganisms, some of which can promote the bioavailability of plant nutrients, convert nitrogen into plant-available forms and improve soil structure. Thus, fertility management and building soil organic matter can lead to a slow snowball effect of improved soil health.

The importance of soil pH management also must not be overlooked, as it can affect nutrient availability and plant growth. For example, in a highly acidic (low pH) soil, aluminum and manganese toxicity can occur and limit growth of some plant species and cultivars. Low pH can also lead to the deficiency of plant macronutrients calcium, magnesium, phosphorus, potassium and even nitrogen. High soil pH can also lead to deficiency of phosphorus and various micronutrients, such as manganese, iron and zinc. In addition to nutrient deficiencies and corresponding yield reductions, extreme soil pH — high and low — can negatively affect beneficial microbial communities and be detrimental to overall ecosystem health.

AUBURN DATA

Careful soil pH and fertility management can yield visible results in food plots within a growing season. However, food plotters will not necessarily see improvements in all or even most soil health indicators within that period. Substantial soil health improvements might take years, depending on the local environment, land management practices and baseline soil characteristics. For example, where I work in central Alabama, the land is highly eroded and naturally acidic, and often has initially low soil organic matter. Therefore, I would expect soil health and productivity to improve through many years. That does not mean that land stewardship through soil fertility and pH management is an exercise in futility. This is demonstrated at a historic site in Alabama's eroded, acidic, low-organic-matter soils.

The influence of soil fertility on long-term crop production and soil health is clearly displayed at Auburn University's Cullars Rotation, an experiment established in 1911 and listed on the National Register of Historic Places. The Cullars Rotation tests soil fertility variables in a three-year summer cash crop rotation, which includes cool-season forages crimson clover and winter wheat. Variables include major macronutrients such as nitrogen, potassium, phosphorus, and sulfur, in addition to limestone (calcium carbonate) and micronutrients. An important component of this experiment is the initially degraded state of the site because of historically intensive land management and local geology, which is why the area has initially low soil organic matter. Because of those factors, the Cullars Rotation demonstrates the long-term consequences of sufficient and insufficient soil fertility.

THE CULLARS ROTATION, AUBURN UNIVERSITY COLLEGE OF AGRICULTURE

Some plots at the Cullars Rotation have not received limestone since 1911, and other plots have received no limestone or fertilizers during that time. These treatments have had pH measurements from 4.5 to 5.0 in recent years, but other limestone-receiving treatments have a pH higher than 6.0. Ten-year average winter wheat yields are also substantially lower for the no-limestone and no-limestone-or-fertilizer plots (4 and 1 bushels per acre, respectively) compared to the complete fertility treatment (40 bushels per acre). It's also notable that cash crop yields for the complete fertility treatments with and without micronutrients have been similar for most of the duration of the experiment. That indicates that micronutrients, although essential, do not necessarily need to be applied annually.

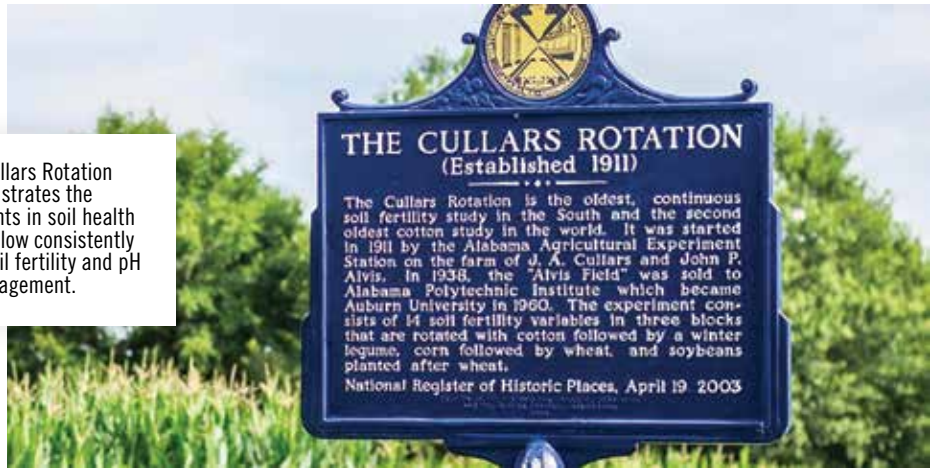


PHOTO COURTESY OF THE AUBURN UNIVERSITY COLLEGE OF AGRICULTURE

■ The Cullars Rotation demonstrates the improvements in soil health that can follow consistently adequate soil fertility and pH management.

A master's thesis from Auburn University (Decker, 2021) measured a variety of soil health indicators and microbial communities at the Cullars Rotation. The research found that research plots without limestone or fertilizer since 1911 had less soil organic matter and were thus less able to hold onto soil nutrients than other treatments. The low-pH research plots also had less ecologically beneficial soil microbial activity compared to the other plots. These plots received little to no carbon returns to soil because of severely reduced crop growth and yield. These low yields are because of soil acidity and poor soil fertility. Research plots with the complete soil nutrient package typically had improved soil health, which was largely because of an increase in decomposing plant residue from crops.

Although the Cullars Rotation evaluates cash crops, it demonstrates the improvements in soil health that can follow consistently adequate soil fertility and pH management, and that it does not need to be overly complicated. Many products are marketed for soil health or to benefit soil microbial communities. Some might be effective, but ensuring a successful forage stand through soil fertility management is sufficient and has been thoroughly tested in the short and long term. Following soil test reports and fertilizing according to your planned forages can contribute to successful crop growth and gradually improve soil health. Successful crop growth leads to the return of above- and below-ground plant residues to the soil, which will feed soil microorganisms and through time improve soil health.

CONCLUSION

Soil fertility is at the very least a seasonal investment in your food plots, but consistent management supported by routine testing can be a long-term investment in your land and the vast ecosystem it supports. In my opinion, that gets to the heart of sustainability. Auburn University has 113 years of research data to prove that point.

CITATION:

Decker, H. (2021). Influence of Cover Crops and Fertility Management on Soil Health and Soil Microbial Community [Master's thesis, Auburn University]. Auburn University Electronic Theses and Dissertations. https://etd.auburn.edu//handle/10415/7971.

Editor's note: Anna Johnson is with the Department of Crop, Soil and Environmental Sciences at Auburn University.

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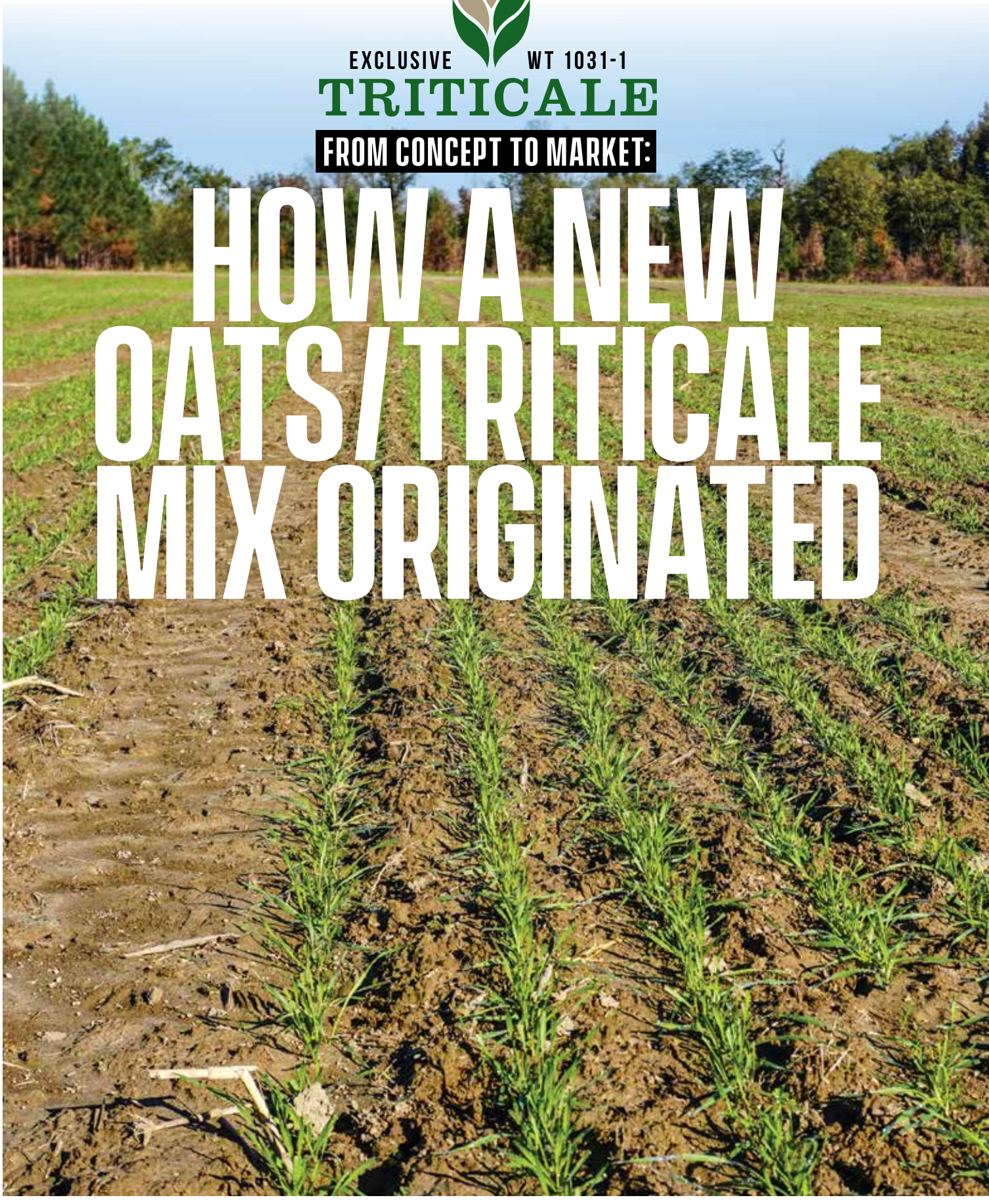
TRITICALE

FROM CONCEPT TO MARKET:

HOW A NEW OATS/TRITICALE MIX ORIGINATED



Years of rigorous development and testing highlights Whitetail Institute's unique relationship with top plant biologists and universities. ■ ***By Whitetail Institute Staff***

Folks who plant Whitetail Institute products expect to see a lush, green crop emerge soon after planting. What they might not see is the broad scientific study and partnerships that went into developing that product.

Starting in 2025, Whitetail Oats Plus will feature a specially developed line of triticale: WT1031-1 Triticale. The bottom line for food plotters is the new mix improves palatability and winter hardiness. But moreover, the research and development of the product showcases Whitetail Institute's partnerships with leading universities and plant breeders.

BEGINNINGS. RESEARCH. DEVELOPMENT

For more than 20 years, Steve Leath, a Ph.D. in plant pathology and breeding, and a former USDA scientist and former professor at North Carolina State University, has worked with Paul Murphy, a retired professor of crop and soil sciences at N.C. State, with 50 years of experience in breeding oats and small grains. Among their collaborations, Leath and Murphy worked on breeding small grains including oats primarily for farmers, focusing on lines with high sugar content for palatability and winter hardiness. That research also included several lines of triticale.

Murphy said he's been breeding triticale for more than 20 years and developed a line that was highly palatable. Triticale is a cross between wheat and rye and grows slowly, making the sugar and proteins concentrated in the plant for longer periods. However, it did not make sense to market it to farmers, as triticale is still in less demand as a grain crop than other small grains. As a result, Murphy and Leath began looking at the food plot market because of triticale's great traits, such as winter hardiness, nutrition and palatablity. Of course, they first needed proof that deer would prefer their triticale.

Grains developed at N.C. State also were enrolled in a study at Louisiana State University that examines deer preferences for plant consumption. More than 300 lines of grain are enrolled in this study at various sites, making it the largest study of its kind ever conducted. During the study, researchers plant lines in 60- to 70-foot test areas parallel to each other. Lines are randomized in order and fenced off as they grow. When the plants reach an appropriate growth stage, researchers remove the fences, and deer are turned loose on the test plots and allowed to graze freely. Researchers then determine deer preference for various lines by observation and measuring plant growth after deer are removed from the test areas. And deer in the study showed a preference for the lines developed at N.C. State.

Murphy said it's important to note that deer feeding preference studies included sites in various geographies, such as the North Carolina piedmont region along with colder mountain climates. Sites included sandy, clay and other soil types, and the plants thrived in all.

"This is important, as growing conditions and soil types vary, and you want a plant that's highly adaptable and tolerant of different conditions," he said. "We found this triticale line to be very adaptable and forgiving."

Moreover, the triticale exhibited excellent winter hardiness.

"Judging how deer prefer them is pretty easy and scientific," Leath said. "It's just a matter of measuring. The cold tolerance is more a matter of observation and noting freezing damage or stress on the plants. We were very pleased with the condition of the plots after temperatures below 5 degrees set in."

Perhaps most important is the food value of the oats/triticale combination.

"We shipped samples to Wisconsin, where they did a dairy forage quality analysis that measures nutrition quality," Leath said. "The test is for a number of traits including total digestible nutrients, protein levels and basically measures the nutrition quality for a ruminant. We were very pleased to see our numbers come back very high."

AN ADVANTAGE FOR GROWERS

Years of research and testing have boiled down to a product that will serve food plotters well.

"Given adequate soil moisture, the plots should come up within 10 days," Murphy said. "I'd plant two to three weeks before the archery season and expect healthy and attractive plots well beyond the close of season in most areas. It's important to note that the testing we do is not conducted on an island. Breeders from other states share information and cooperate, so the testing we've done is being repeated in other areas across the country. We're confident hunters and managers will have a lot of success with this combination. This new triticale is akin to a beauty pageant winner from a contest that's been going on for over 15 years."

Leath agreed, saying the oats/triticale mix is a result of years of experiments, plant breeding expertise and experience, and a fine sense for noting special plant characteristics.

"Paul Murphy has looked over hundreds of thousands of lines since 1984 and has a special talent for recognizing the best varieties among the entrants," he said. "This is a giant numbers game that's 50 percent science and 50 percent just using your eye and your experience to choose the award winner. And this is it. The forage is excellent for deer, and in my experience, there's nothing simpler and easier for the food plotter than small grains."

■ Deer in a Louisiana State University study showed a consumption preference for triticale lines developed at North Carolina State.

MY TROPHY WHITETAILS

BARRY SCHMITT | WISCONSIN

I mainly use Imperial Whitetail Clover. For many years, I bought the cheapest clover seed I could find, but I read numerous times how deer preferred Imperial Whitetail Clover. Still being skeptical, I just bought a small bag of Whitetail Clover to try it out. I used it the first time on a food plot I can see from my residence, and I was amazed. I saw more deer come to that plot during summer and early fall than I have ever seen. They would cross other food plots and agricultural fields just to feed on that clover. I was sold and have used Imperial Whitetail Clover as my main perennial. My land is in western Wisconsin, just ½-mile east of the Buffalo County border, so we are at no shortage of big bucks and heavy hunting pressure. Being able to attract and hold deer on your property is vital to hunting success. Whitetail Imperial Clover has allowed me to do that. Below is a picture of my wife and me with my 2022 buck, and he is only the latest of a number of trophy bucks we have harvested through the past decade.

MY TROPHY WHITETAILS

LUKE JANKA | MINNESOTA

■ This deer was shot over an Imperial Whitetail Clover plot. I'm trying a new plot this year with the PowerPlant.

TERRY GRINESTAFF | PENNSYLVANIA

■ I love the products and they work better than [those from] my hometown seed company. The picture shows my granddaughter and son in Beets & Greens. It was her first buck, and she got it in archery season at 33 yards away.

JAKE KUHN | KENTUCKY

■ I originally planted white and red clover from the local farm co-op for my chickens. And then I started planting a few small plots for deer. I struggled with weed control for years, having to replant annually. Then in 2016, I expanded my honeybee operation and wanted to establish more clover plots. I joined a food plot Facebook group that has a few Whitetail Institute experts as members, and I started to learn more about weed control. In 2015, as part of a USDA grant, I created four clover plots on two farms using Imperial Whitetail Clover or Fusion. With proper soil amendments based on soil tests, I got great stands, and I was ready to tackle weed control. In 2016, I killed two 10-inch-plus bearded gobblers in the spring season on or near the clover plots. In 2017, I started to see improvements in the deer herd health, and in 2018, I started seeing more and bigger bucks. I let a bunch of 8-point bucks walk, and it was hard for my Florida friends to do the same. In 2020, 2021 and 2023, I killed big bucks. At 141, 142 and 145 Boone and Crockett gross score, I was shooting trophy deer for my area. My Florida and Tennessee friends started killing the biggest bucks of their lifetimes. We are letting nice 8- and 10-points walk. Whitetail Institute seed has been a huge game changer on my farms.

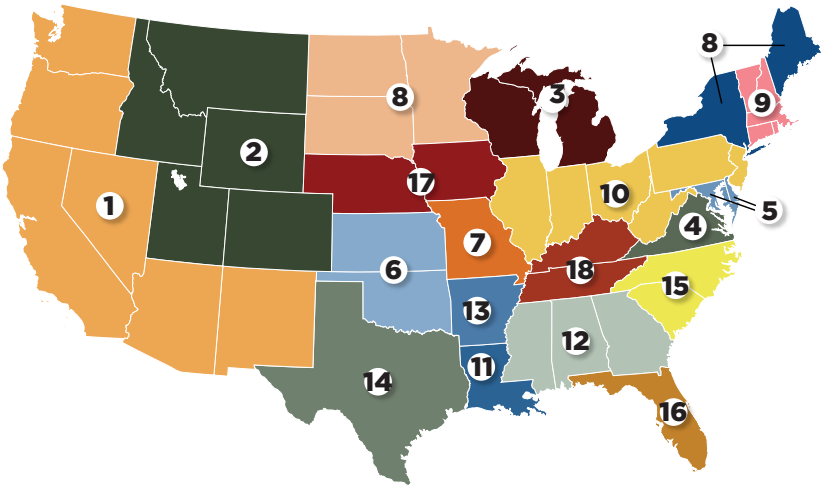
THOMAS ZGODA | NEW YORK

■ Bigger deer, bigger-antlered bucks, especially during the rut.

DAVE SCHERRER | MISSOURI

■ The primary Whitetail Institute product I purchase is Imperial Whitetail Clover. I have a small farm and use clover, chestnut and persimmons as reliable food sources. It has been effective for many years now. I also have great results when frost seeding the clover.

FOOD PLOT PLANTING DATES...



PLANTING DATES FOR IMPERIAL CLOVER, ALFA-RACK PLUS, EXTREME, NO-PLOW, FUSION, CHIC MAGNET AND EDGE

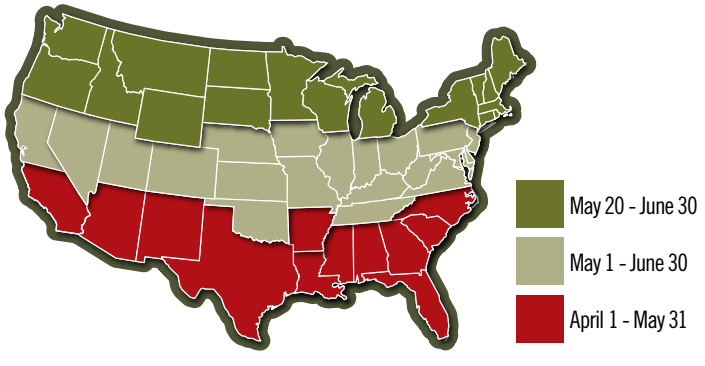
1. **Call for planting dates**
2. Apr 1 - July 1
3. Apr 15 - June 15
   Aug 1 - Sept 1
4. **Coastal:** Feb 1 - Mar 15
   Sept 1 - Oct 15
   Southern Piedmont:
   Feb 15 - Apr 1
   Aug 15 - Oct 1
   Mountain Valleys:
   Mar 1 - Apr 15
   Aug 1 - Sept 15
5. Feb 1 - Apr 1
   Aug 1 - Sept 30
6. Feb 1 - Apr 15
   Sept 1 - Nov 1
7. **North:** Mar 15 - May 1
   Aug 1 - Sept 15
   South: Mar 1 - Apr 15
   Aug 15 - Oct 15
8. Apr 1 - June 15
   July 15 - Sept 5
9. Apr 1 - May 15
   Aug 1 - Sept 15
10. Mar 20 - May 15
    Aug 1 - Sept 15
11. Sept 15 - Nov 15
12. Feb 5 - Mar 1
    North: Sept 5 - Nov 15
    South: Sept 25 - Nov 15
13. Feb 15 - Apr 1
    Sept 1 - Oct 30
14. **North:** Sept 15 - Nov 15
    South: Sept 25 - Nov 15
15. Feb 1 - Mar 1
    Coastal: Sept 25 - Oct 15
    Piedmont: Sept 1 - Oct 5
    Mountain Valleys:
    Aug 25 - Oct 15
16. **North:** Sept 25 - Nov 25
    South: Oct 5 - Nov 30
17. Mar 1 - May 15
    Aug 1 - Sept 15
18. Feb 1 - Apr 15
    Aug 20 - Sept 30
19. Apr 15 - June 15
    July 1 - Aug 15
20. May 15 -July 1
21. May 1 - June 15
    July 1 - Aug 15
22. May 15 - July 1

PLANTING DATES FOR WHITETAIL OATS PLUS

Use the map above as a guideline for when to plant Imperial Whitetail Oats Plus in your area. For best results, wait to plant until excessively hot, droughty summer weather has passed. Imperial Whitetail Oats Plus is highly cold-tolerant and designed to provide abundant forage from fall into spring in the southern U.S. and from fall into winter in colder climates.

PLANTING DATES FOR VISION, PURE ATTRACTION, SECRET SPOT, WINTER PEAS, BOWSTAND, AND DESTINATION

1. **Call for planting dates**
2. **Call for planting dates**
3. Aug 1 - Sept 15
4. **Coastal:** Sept 1 - Oct 15
   Piedmont: Aug 15 - Oct 1
   Mountain Valleys:
   Aug 1 - Sept 15
5. Aug 1 - Sept 30
6. Aug 15 - Nov 1
7. **North:** Aug 1 - Sept 30
   South: Aug 15 - Oct 15
8. July 15 - Sept 5
9. Aug 1 - Sept 15
10. Aug 1 - Sept 15
11. Sept 15 - Nov 15
12. **North:** Sept 5 - Nov 15
    South: Sept 25 - Nov 15
13. Sept 1 - Oct 30
14. **North:** Sept 15 - Nov 15
    South: Sept 25 - Nov 15
15. **Coastal:** Sept 15 - Oct 15
    Piedmont: Sept 1 - Oct 5
    Mountain Valleys:
    Aug 25 - Oct 15
16. **North:** Sept 25 - Nov 25
    South: South: Oct 5 - Nov 30
17. Aug 1 - Sept 15
18. Aug 20 - Sept 30
19. July 1 - Aug 15
20. June 15 - July 15
21. July 15 - Aug 31
22. July 1 - Aug 15



PLANTING DATES FOR POWERPLANT, REVIVE CONCEAL, SUNN HEMP AND TURKEY SELECT

*Do not plant PowerPlant, Sunn Hemp or Conceal until soil temperatures reach a constant 65 degrees F. Wait as long as necessary for soil temperatures to reach a constant 65 degrees F before planting.

PLANTING DATES FOR WINTER-GREENS, TALL TINE TUBERS, BEETS & GREENS AND RAVISH RADISH

1. **Call for planting dates**
2. **Call for planting dates**
3. July 1 - Sept 1
4. **Coastal:** Aug 15 - Sept 30
   Southern Piedmont:
   Aug 1 - Sept 15
   Mountain Valleys:
   Aug 1 - Sept 15
5. July 15 - Sept 15
6. Aug 1 - Oct 1
7. **North:** July 15 - Sept 15
   South: Aug 1 - Oct 1
8. July 5 - Aug 20
9. July 1 - Aug 30
10. July 15 - Sept 15
11. Sept 15 - Nov 15
12. **North:** Sept 5 - Nov 1
    Central: Sept 15 - Nov 15
    South: Sept 25 - Nov 15
13. **North:** Aug 15 - Oct 1
    South: Sept 5 - Oct 15
14. **North:** Sept 5 - Oct 30
    Central: Sept 15 - Nov 15
    South: Sept 25 - Nov 15
15. **Coastal:** Sept 1 - Oct 1
    Piedmont:
    Aug 15 - Sept 20
    Mountain Valleys:
    Aug 5 - Sept 15
16. **North:** Sept 15 - Nov 15
    Central: Sept 25 - Nov 15
    South: Oct 5 - Nov 30
17. July 15 - Sept 1
18. Aug 1 - Sept 30
19. July 1 - Aug 15
20. June 15 - Aug 1
21. July 15 - Aug 31
22. July 1 - Aug 15

DISCOUNT COUPONS

ORDER TODAY!

SHIPPING INCLUDED IN PRICES

YOU SAVE $29.98

IMPERIAL WHITETAIL
CLOVER

36 LBS.-4.5-ACRE PLANTING

$249.98 + tax
Suggested Retail $279.96
___ (36 lb.) quantities of Imperial Whitetail Clover
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $42.98

IMPERIAL WHITETAIL
EXTREME

33.6 LBS.-1.5-ACRE PLANTING

$198.96 + tax
Suggested Retail $241.94
___ (33.6 lb.) quantities of Imperial Whitetail EXTREME
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $20.03

IMPERIAL W…
C…NCEAL

28 LBS.-1-ACRE PLANTING

SOLD OUT!
Call 1-800-688-3030 opt1 to pre-book for 2025

…ax
…99
___ (28 lb.) quantities of Imperial Whitetail Conceal
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $43.00

IMPERIAL WHITETAIL
FUSION

27.75 LBS.-4.5-ACRE PLANTING

$246.96 + tax
Suggested Retail $289.96
___ (27.75 lb.) quantities of Imperial Whitetail Fusion
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $5.02

IMPERIAL WH…
PO…

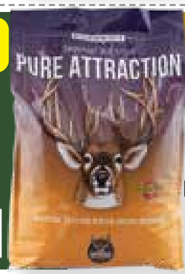
50 LBS.-1.5-2-ACRE PLANTING

SOLD OUT!
Call 1-800-688-3030 opt1 to pre-book for 2025

___ (50 lb.) quantities of Imperial Whitetail PowerPlant
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $30.00

IMPERIAL WHITETAIL
PURE ATTRACTION



39 LBS.-.75-ACRE PLANTING

$84.96 + tax
Suggested Retail $114.96
___ (39 lb.) quantities of Imperial Whitetail Pure Attraction
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $29.98

IMPERIAL WHITETAIL
WINTER-GREENS

24 LBS.-4-ACRE PLANTING

$189.98 + tax
Suggested Retail $219.96
___ (24 lb.) quantities of Imperial Whitetail Winter-Greens
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $39.95

IMPERIAL WHITETAIL
"CHIC" MAGNET

9 LBS.-3-ACRE PLANTING

$99.99 + tax
Suggested Retail $139.94
___ (9 lb.) quantities of Imperial Whitetail "Chic" Magnet
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $34.98

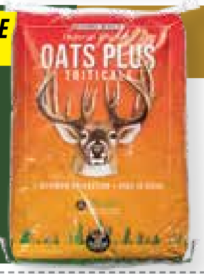
IMPERIAL WHITETAIL
TALL TINE TUBERS

24 LBS.-4-ACRE PLANTING

$164.98 + tax
Suggested Retail $199.96
___ (24 lb.) quantities of Imperial Whitetail Tall Tine Tubers
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $10.98

IMPERIAL WHITETAIL
OATS PLUS



45 LBS.-1/2-ACRE PLANTING

$69.00 + tax
Suggested Retail $79.98
___ (45 lb.) quantities of Imperial Whitetail OATS Plus
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $42.98

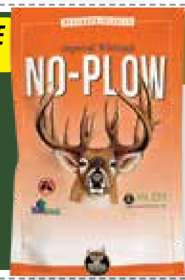
IMPERIAL WHITETAIL
ALFA-RACK PLUS

33LBS.-2.5-ACRE PLANTING

$246.98 + tax
Suggested Retail $289.96
___ (33 lb.) quantities of Imperial Whitetail Alfa-Rack Plus
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $30.04

IMPERIAL WHITETAIL
NO-PLOW



40 LBS.-2.25-ACRE PLANTING

$109.92 + tax
Suggested Retail $139.96
___ (40 lb.) quantities of Imperial Whitetail No-Plow
TOTAL *(Add 7% Sales Tax)*
$________

YOU SAVE $20.00

IMPERIAL WHITETAIL

WINTER PEAS PLUS

44 LBS.-1-ACRE PLANTING

$129.96 *+ tax*
Suggested Retail $149.96
___ (44 lb.) quantities of Imperial Whitetail Winter-Peas Plus
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $16.05

IMPERIAL WHITETAIL

KRAZE

$42.96 *(4) pak*
Suggested Retail $52.99
$59.94 *(6) pak*
Suggested Retail $75.99
+ tax
___ (4) 5lb bags @ $42.96
___ (6) 5lb bags @ $59.94
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $15.00

IMPERIAL WHITETAIL

RAVISH RADISH

10 LBS.-1-ACRE PLANTING

$79.96 *+ tax*
Suggested Retail $94.96
___ (10 lb.) quantities of Imperial Whitetail Ravish Radish
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $6.03

IMPERIAL WHITETAIL

APPLE OBSESSION

$49.96 *(4) pak*
Suggested Retail $52.99
$69.96 *(6) pak*
Suggested Retail $75.99
+ tax
___ (4) 5lb bags @ $44.96
___ (6) 5lb bags @ $69.96
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $7.06

IMPERIAL WHITETAIL

DESTINATION

36 LBS.-1-ACRE PLANTING

$129.96 *+ tax*
Suggested Retail $137.02
___ (36 lb.) quantities of Imperial Whitetail Destination
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $20.02

IMPERIAL WHITETAIL

IMPACT SOIL AMENDMENT

• 8.5LBS - .5 ACRES
• 25.5LBS - 1.5 ACRES

$59.98 *(8.5lbs)*
Suggested Retail $80.00
$149.94 *(25.5lbs)*
Suggested Retail $169.95
___ (8.5lbs) of Impact $59.98
___ (25.5lbs) of Impact $149.94
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $11.97

IMPERIAL WHITETAIL

30-06 BLOCK

$34.98 *(one block)*
Suggested Retail $39.95
$57.98 *(two blocks)*
Suggested Retail $69.95
+ tax
___ (2) -Pak blocks @ $57.98
___ (1) -Pak blocks @ $34.98
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $13.00

ARREST MAX HERBICIDE

• 1 PINT-1 ACRE
• 1/2 GALLON-4 ACRES

$56.99 *(1 pint)*
Suggested Retail $69.99
$159.96 *(1/2 gallon)*
Suggested Retail $169.00
___ pint(s) of Arrest Max Herbicide
___ 1/2 gallon(s) of Arrest Max Herbicide
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $11.97

IMPERIAL WHITETAIL

MAGNET MIX BLOCK

$32.99 *(one block)*
Suggested Retail $39.95
$57.98 *(two blocks)*
Suggested Retail $69.95
+ tax
___ (2) -Pak blocks @ $57.98
___ (1) -Pak blocks @ $32.99
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $39.02

SLAY HERBICIDE

• 4 OZ.-1 ACRE
• 1 PINT-4 ACRES

$57.98 *(4 oz.-1 acre)*
Suggested Retail $72.99
$129.98 *(1 pint-4 acres)*
Suggested Retail $169.00
___ 4 oz. of Slay Herbicide
___ pint(s) of Slay Herbicide
TOTAL *(Add 7% Sales Tax)*
$_____

SHIP TO: _____

Name: _____

Address: _____
(No PO Boxes, Cannot Ship to Canada)

City: _____ State: _____ ZIP: _____

Phone: _____ Email: _____

Payment: ❑ *Check or Money Order enclosed*

Charge to: ❑ *Visa* ❑ *Mastercard* ❑ *Discover* ❑ *AMEX*

Credit Card #: _____

Exp. Date: _____ Sec.Code: _____

Signature: _____

Whitetail Institute
MAIL TO: 239 Whitetail Trail, Pintlala, AL 36043
CALL TOLL FREE: 800-688-3030 • www.whitetailinstitute.com