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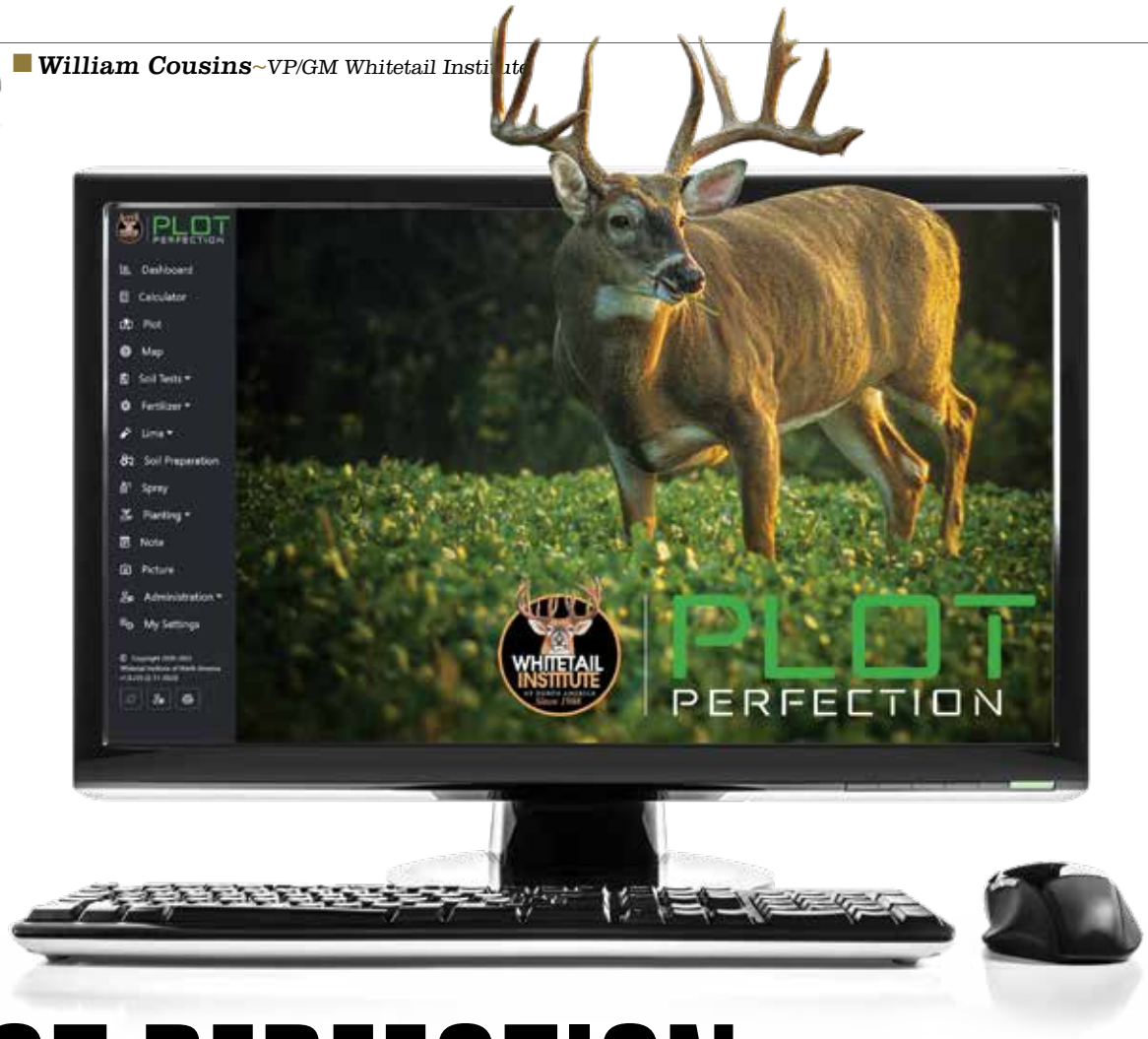

PLOT PERFECTION

The Whitetail Institute has always been the leader of the food plot industry because we continue to raise performance expectations and the customer service bar. The latest example of that is Whitetail Institute's recently announced PlotPerfection app, which is truly new technology specifically designed for food plotters.

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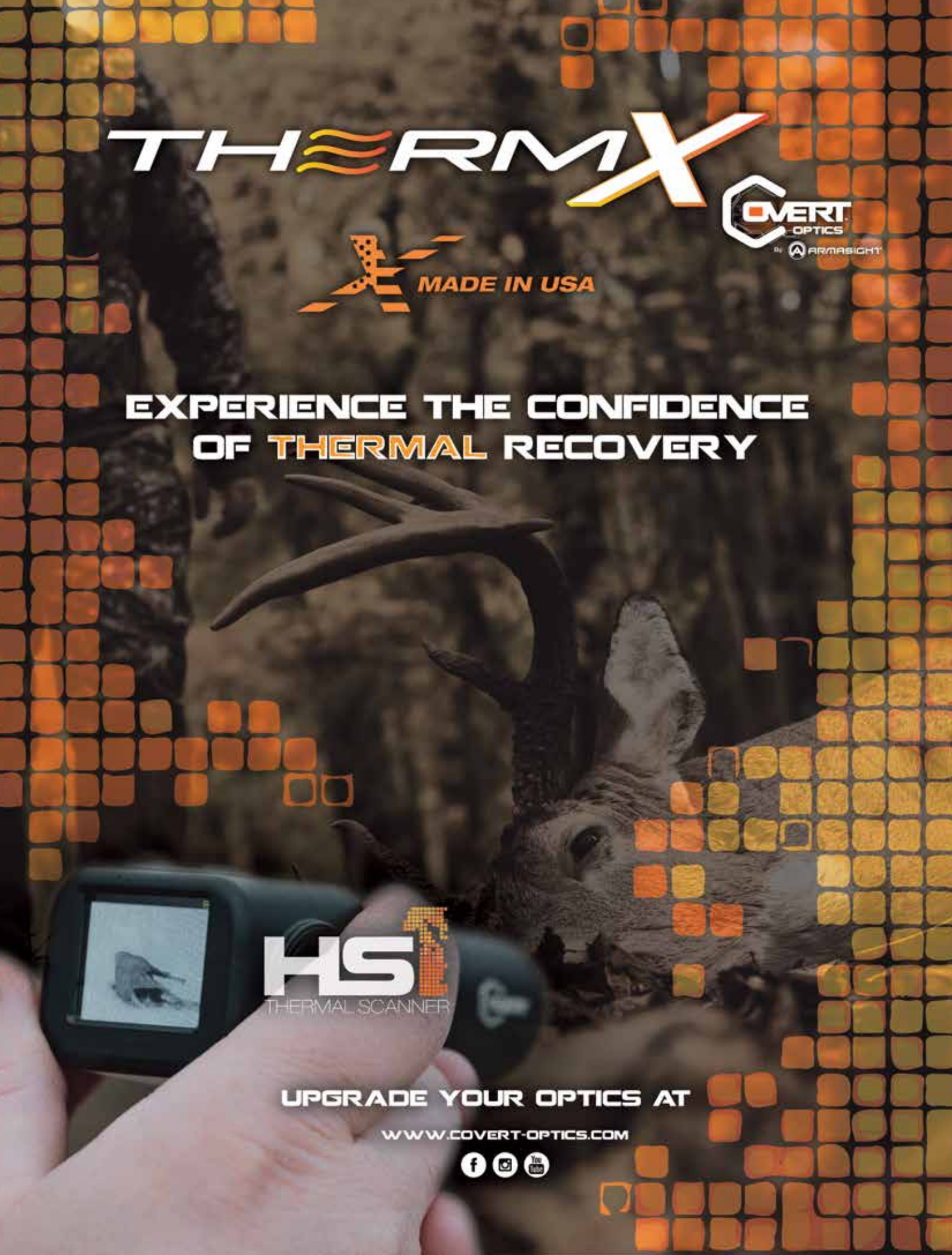
We've all heard the saying, "Some things change, and others stay the same." The Whitetail Institute recognizes how those seemingly independent ideas can be completely dependent upon each other, because for all the things that have changed through the years, one thing never has and never will — our commitment to unmatched customer service. By that, I mean service that truly helps our customers in real-world ways and that exceeds their every expectation, because our dedication to whitetails and the customers who pursue them are the reason Whitetail Institute continues to be the leader in the industry we started nearly four decades ago.

To learn more about PlotPerfection, watch an introductory video or download the app, visit plotperfection.com.

— William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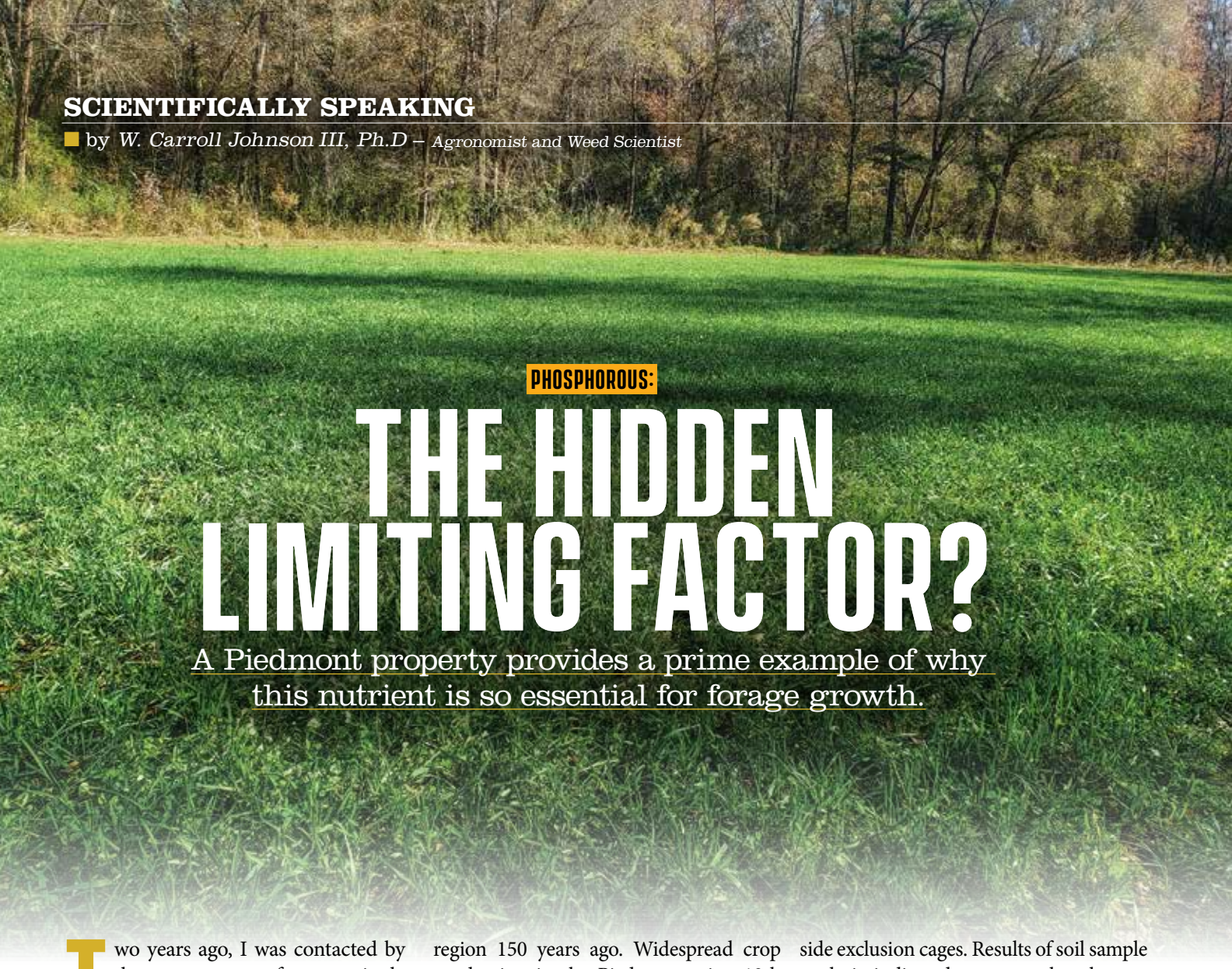

PHOSPHOROUS:

THE HIDDEN LIMITING FACTOR?

A Piedmont property provides a prime example of why this nutrient is so essential for forage growth.

Two years ago, I was contacted by the new owner of a stunningly beautiful woodland property in central Georgia. It featured mature hardwoods, some pines, rolling hills and broad creek bottoms that ran from boundary to boundary.

Central Georgia is in the Piedmont, a broad plateau that separates the Appalachian Mountains from the Coastal Plain along the Atlantic and Gulf coasts. The Piedmont is characterized by rolling terrain and heavy clay soil. For those who have seen the cinema classic Gone with the Wind, think of the landscape around the fictitious plantation Tara as a mimic for the property. In today's context, most land in the Piedmont is not suitable for modern crop production because of the hilly terrain. It's best used for forestry and pastures where tillage is infrequent. Despite the limitations of unsuitable terrain, the Piedmont was a major crop producing region 150 years ago. Widespread crop production in the Piedmont using 19th century agricultural practices resulted in heavy topsoil erosion that ruined the soils, creating the current pitiful condition of sediment-choked creeks and rivers in the region. This is not a recent phenomenon. It started 150 years ago.

As the weed guy, my original task for the landowner was to prescribe a weed management plan for existing forages (clover) and a pre-plant weed management plan for new food plot sites. The first step was to hike through each site to identify weed problems and gauge overall food plot potential. Perennial broadleaf weeds presented challenges. However, another factor became obvious. In sites with previously established clover, I observed clover plants that were stunted and with leaflets that were smaller than normal. This was not because of excessive deer grazing, as I noticed those symptoms inside and outside exclusion cages. Results of soil sample analysis indicated a severe phosphorous deficiency — the worst I have ever seen. Most of the food plots on the property had phosphorous levels in single digits; often less than 2 parts per million. A common goal for phosphorous levels in soil for clover is 40 to 50 ppm. It was a dose of reality for me that although weeds were problematic, they were not the limiting factor for food plot productivity on that property. Phosphorous deficiency was the limiting factor.

Phosphorous is one of three major nutrients needed in large quantities for crop growth. The others are nitrogen and potassium. In blended fertilizers, the percentage of phosphorous in the product is the middle number of the three-number sequence. For example, the turfgrass fertilizer 16-4-8 contains 4 percent phosphorous. Super-phosphate fertilizer is 0-46-0, which contains 46 percent phosphate, and

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Phosphorous is integral for the biochemical processes associated with energy conversion necessary for plant growth. Because the role of phosphorous is linked to cellular metabolism and plant growth, symptoms of phosphorous deficiency include stunted plants, small leaves, abnormal root growth and occasionally leaves with a purplish tint. That explains why clover on the central Georgia property with the extreme phosphorous deficiency were stunted.

Phosphorous is not overly mobile in the soil. In most soils, phosphorous is chemically bonded to the soil particles (adsorption, and yes, that is spelled correctly). For that reason, phosphorous accumulates in the soil, which lessens the need to apply phosphate fertilizer annually when desired levels are reached. Phosphorus is not prone to leaching (vertical movement with water in the soil). Because it's chemically bonded to soil particles, phosphorous goes where the soil goes. In practical terms, if a site is prone to soil erosion and sediment runs into streams or lakes, phosphorous will be carried with the sediment into the surface water. That's the root cause of phosphate pollution in areas such as Chesapeake Bay and the Gulf of Mexico near the confluence with the Mississippi River. Excessive amounts of phosphorous in sediment can cause algal blooms in water. Controlling soil erosion from food plots and agricultural fields will reduce phosphate pollution.

In food plots, phosphate fertilizer can come from two sources: mined phosphate rock or poultry litter. The key to judicious use of phosphate fertilizers is to test the soil and apply fertilizer when recommended for the forage grown. Guessing fertilizer needs is wasteful. As a point of emphasis, the cost of phosphate fertilizer has increased by almost 70 percent in the past year. Ignoring soil testing and over-applying phosphate fertilizer based on a hunch or guess might result in an unnecessary expense.

There is a unique relationship between phosphorous availability to plants and soil pH. When soils are acidic (low pH), phosphorous chemically binds with iron and aluminum in acid soils, reducing availability to plants. On the other hand, if soil pH is greater than 7.5, phosphorous is bound to calcium and unavailable to plants. Together, those relationships indicate the ideal pH for phosphorous availability is 6.0 to 7.5. It's worth noting the availability of all essential elements for crop growth are affected by pH. Be careful when reaching conclusions on the ideal pH for a food plot based on the relationship with one essential element.

I have no knowledge of the land-use practices at the central Georgia property decades ago. Being a student of history and lifelong resident of the southeastern United States, I have a decent general idea. Compared to other soils and regions, Piedmont soils in their original condition never had much phosphorous. Piedmont farms were largely cleared of timber in the 1800s and planted to cotton or corn (for draft animal feed). During that time, knowledge of soil chemistry was rudimentary. Certainly, astute observations were made, but there was no scientific explanation why crops performed better during certain management conditions. Further, the only fertilizer source was usually animal manure. There was no knowledge of what elements were essential for plant growth — such as phosphorous. At best, crop yields were barely subsistence level in Piedmont soils and quickly diminished because of nutrient depletion. As soil productivity petered out, farmers abandoned fields, and production moved elsewhere. Abandoned fields reverted to mixed hardwoods and pine, which is their current state.

Food plots at those sites are likely just as nutrient deficient and acidic as they were in the 1800s when planted to cotton or corn. In 2022, we can do better than that when managing food plots. Probably no soil amendments were added to old Piedmont fields 150 years ago, and it's a safe bet that none have been added since. That's an educated guess based on the history of the region, current soil analysis and poor clover growth. There's no way to know for sure. However, it was obvious during my 2020 visit that the soil health on that property was poor, and that overall assessment was clearly illustrated by extreme phosphorous deficiency. I can say with confidence that the only way to capture the true forage potential in soils at woodland sites such as those is to test the soil and fertilize/lime according to recommendations. In this example, the phosphorous deficiency was easily fixed, and the benefits will last for several years. As a result, the improvements in forage productivity by correcting phosphorous deficiency were astonishing.

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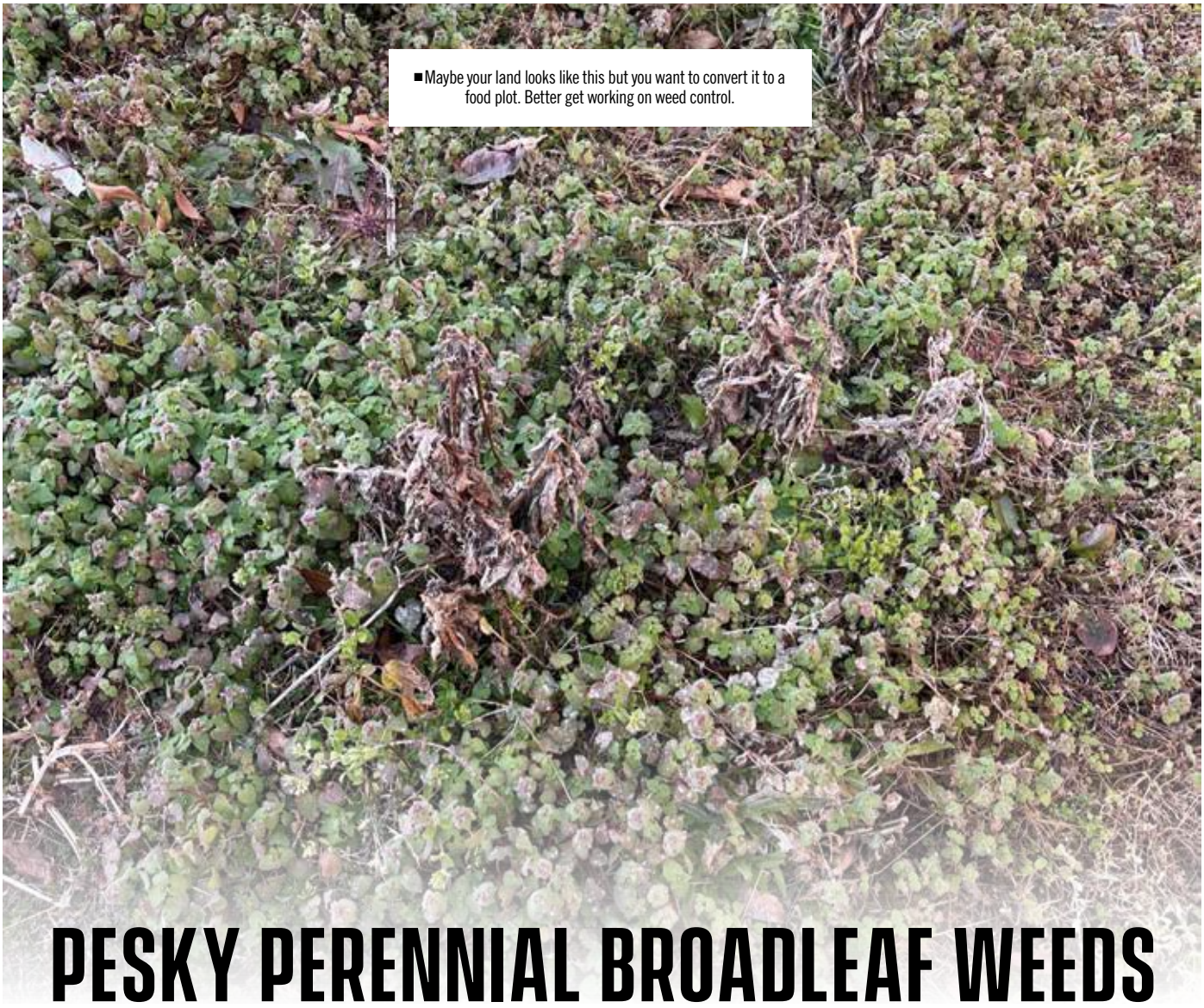
by *Joyce Allison Tredaway, Ph.D.* – *Agronomist and Weed Scientist*



■Maybe your land looks like this but you want to convert it to a food plot. Better get working on weed control.

PESKY PERENNIAL BROADLEAF WEEDS

Combining herbicides, tillage and mowing is the best and most cost-efficient way to control perennial broadleaf weeds in food plots.

As I drove in a heavy snowstorm, my teenage sons were afraid I might wreck, as a "big" snow in Alabama is 2 to 4 inches. I assured them I could drive safely, and that although it was dark and the snow was falling around 24 inches per day, we were safe. Suddenly, our truck swerved to a stop. Deer crossed the road, and I spotted them early enough. Dealing with perennial weeds can be viewed similarly. If you can be aware of your surroundings and spot perennial weeds when they arrive, they are easier to control. Be proactive.

Maybe this is what your land looks like, and you want to convert it into a food plot. Or perhaps after several years, your food plot looks like this. Perennial broadleaf weeds are by far the most difficult to control because of their ability to spread vegetatively and by seed. Perennials produce large numbers of seeds, and research has shown they are viable during various conditions for many years and after passing through animals. A study at two sites in New York indicated that whitetail deer might be the most important vector for long-distance seed dispersal. Of the plant species found in the research, 27 were considered weeds in the Northeast, and 11 were classified as noxious, including oak-leaved goosefoot (Chenopodium glaucum). In addition, 14 of the species were cultivated and had escaped, including moss rose (Portulaca grandiflora).

Perennial weeds are competitive and more difficult to control than annual weeds for several reasons. They can reproduce and propagate by many methods. A perennial plant lives for two or more years and is characterized by re-

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newed growth year after year from the same root system. Perennial plants also can produce seeds, like an annual plant, or can spread vegetatively. Creeping perennials have stolons, which are aboveground stems (as in bermudagrass); rhizomes, which are underground stems (johnsongrass); spreading root systems with buds (sowthistle); or tubers, which are modified rhizomes adapted for food storage (nutsedges). Woody perennials have stems with secondary thickening and an annual growth increment (brambles).

Because of the nature of plants in food plot mixtures, weed control in food plots requires a different approach than other weed management systems. A significant portion of the program in an established healthy food plot comes from crop competition. Maintenance of a relatively weed-free food plot includes proper fertilization, cutting management and herbicide applications to keep the food plots competitive and healthy. These conditions increase the vigor of the crop and make it more competitive at all stages of growth.

Common weeds grow much more vigorously than small-seeded legume forages, so when establishing food plots, it's essential to take control measures. That means eliminating weeds before planting, weed control before seeding, using the proper seeding rate and proper use of mowing to suppress quick-emerging weeds. Because of their growth habits and seed production, perennial weeds are the hardest to control and will present the largest problems to food plots if left partially controlled. Let's review some options to control perennial broadleaf weeds and give your food plots the best start.

Some common perennial weeds about which we receive questions include thistle, goldenrod, dogfennel and Carolina horsenettle. To control perennial weeds such as those requires a fallow (no crop) period, preferably during summer, when those weeds are actively growing. That can best be achieved by spraying nonselective herbicides, such as a mixture of glyphosate and triclopyr or 2,4-D. I prefer triclopyr to 2,4-D on weeds such as thistle, goldenrod, horsenettle, trumpetcreeper and briars/brambles. It can penetrate hard, woody stems better than 2,4-D. These herbicides have minimal soil residual properties, so a food plot can be re-established in fall. After the herbicide application, wait about two weeks, and harrow monthly or at six-week intervals. This will stimulate weed seeds in the soil to germinate for follow-up control with another application of glyphosate plus triclopyr or 2,4-D. The repeated combination of spraying nonselective herbicides and light tillage throughout summer should help deplete reserves of perennial weed seeds in the soil. Re-seed in fall with a food plot seed. Seeding with annual forages is preferable after a large perennial weed infestation.

Starving carbohydrates is another control method and doesn't involve herbicides. Carbs are stored in the roots, rhizomes, stolons, tubers, nutlets or bulbs of perennial weeds. Start this when carbohydrate reserves are at their lowest, which is typically after the weeds have overwintered and are emerging in spring. When the weeds begin to break through the soil surface, the carbohydrate flow will continue to flow from the root toward the shoot for seven to 10 days to establish a leaf canopy. A transition period occurs between 10 to 14 days. Within 14 days, the weed moves carbohydrates from the leaves back to the root. Remember, the starvation of perennial weeds is accomplished by not allowing them to move carbohydrates into the roots. This is done by tilling (or close mowing of tall upright weeds) every seven to 10 days until they cease to attempt to emerge. It's critical to not mistime or be late with tilling or mowing, because one missed or late effort can negate everything to that point. Expect to continue tillage or mowing for four to six months. It might require more time if the process was not started when the carbohydrate reserves in the weed were at the lowest point.

Typically, managers leave a field fallow and shallowly tilled on a weekly schedule for one growing season to eliminate perennial weed problems. This should start with the first sign of the emergence of the weed in spring, and a seven-day tillage schedule should be maintained. This time schedule provides about a three- to seven-day cushion in the event of a wet period when the field cannot be tilled. The schedule must be maintained and be a high priority. One missed tillage can negate all the effort to that point. If wet weather is anticipated, advance the tillage schedule rather than suffer a delay. Preventing carbohydrate from moving from the leaves back into the root is critical for success until the weed is dead.

Finally, ensuring that perennial weeds do not produce seeds can greatly reduce the chances of having to deal with them in the future. Perennial weeds such as thistle and Carolina horsenettle are prolific seed producers. Canada thistle produces 1,500 to 5,300 seeds per plant, and Carolina horsenettle can produce up to 5,000 seeds per plant. If allowed to produce, seeds can remain dormant in the soil for many years. Studies have shown weed seeds can stay dormant for up to 1,000 years and still germinate. Therefore, mowing can be an important component of preventive perennial broadleaf weed control. Keeping the tops mowed off plants such as thistles and horsenettle will prevent seed production, which prevents the spread of weed seeds.

Using a combination of herbicides, tillage and mowing is the most effective and cost-efficient means of controlling perennial broadleaf weeds. The combination allows for a more flexible schedule and fluctuations in weather. However, if a sprayer is not available, you can accomplish it by other means.

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GEORGIA:

PEACH STATE GIANT

Cory Croft's 196-inch Georgia buck showcases his hunting club's management goals. ■ by *Scott Bestul*

PHOTOS BY CORY CROFT

■ After a disappointing archery encounter, Croft made good on a second chance with the buck during the firearms season.

It's not often a Georgia hunter gets a crack at a 190-class whitetail, but Cory Croft actually had two chances at a giant buck in the same season. Croft wounded the buck during an early-season archery hunt but killed the deer while hunting the rut with his rifle. Even better, Croft, who manages a prime tract of whitetail ground, had a three-year relationship with the Peach State monster.

THE CAMPAIGN

Croft was first aware of the buck during the 2019 season.

"He was a 150-class 3-½-year-old that year," he said. "That's a great buck, but on this property, we manage for 5-½-year-old bucks, so he was off-limits that year."

Croft, a certified wildlife biologist and owner of Veritas Wildlife Management Services, was running cameras in November when he got the first pics of the deer.

"He hung around for a couple of weeks but then disappeared," he said. "We're good friends with the neighboring property owners, and when I was talking with them that fall, it turned out that they'd had pics of the buck during the summer, 2-½ miles away. So, he was doing some traveling to hit both properties, but I figured if the buck wanted to summer on them and come to us in the fall, we were getting the better part of that deal."

With high hopes for the 2020 season, Croft scanned camera after camera for the buck, only to be disappointed.

"He just disappeared from our property that fall, and I run a lot of cameras in a grid pattern survey that's pretty intensive," he said. "I can't say I get every buck, but I don't miss many. When I checked with the neighbors, they had the same report: The buck was just a no-show. So, we figured something bad had happened. With that much distance separating our properties, it wasn't hard to imagine."

RENEWED HOPE

But when the 2021 season arrived, Croft was in for a pleasant surprise.

"One day, I got a text from the neighbor that just said, 'He's back,' and I knew exactly which deer he was talking about," Croft said. "And just like before, the buck left them in summer and came to our place in the fall, just in time for the archery opener."

Croft hunted the buck, which had blown up into a true giant, several times during the first weeks of bow season.

"We have 120 acres of food plots on the property, with lots of Whitetail Institute Clover, Whitetail Forage Oats and other varieties, and he was hitting those pretty hard," he said.

Finally, Croft saw the buck during a hastily assembled bowhunt.

"After being busy for a while, I finally had an afternoon to hunt, but as I got my stuff together, I couldn't find my release anywhere," he said. "I had no choice but to run to the store and buy one. I came home and shot it a few times, but really didn't have time to tune it very well. That came back to bite me when I finally went out for the hunt."

Croft saw the monster buck that afternoon.

"He actually came out and walked to within 20 yards," he said. "I needed him to take two steps so I could get a shot at his vitals. Suddenly, a coyote came from behind him and spooked the buck, and he ran out to about 80 yards. Then the coyote ran all the deer off the plot and trotted over toward me. I decided not to shoot him because there were 90 minutes of shooting light left, and I thought I still might have a chance.

So, I spooked the coyote, and sure enough, 20 minutes went by, and the buck came back out to the plot, but this time at 60 yards. He fed for a while and disappeared, and I figured, 'Well, that's it for tonight.' Then suddenly, just at prime time, he came back out and stood at 22 yards. I drew and was settling in, and that's when not knowing that release hurt; I just barely touched it, and it went off before I was ready. I watched in shock as my arrow hit the buck square in the shoulder. I shoot 70 pounds, but I had almost zero penetration and found very little blood."

THE ROLLERCOASTER

Although obviously upset about wounding the buck, Croft got some good news from the neighbor.

"I called to tell him about the hunt and to keep an eye out for the buck," he said. "He told me that he had the buck on camera at 3 a.m., just hours after I'd hit him. I was relieved to know he was alive but obviously disappointed that I hadn't been able to make a clean kill when I had my chance."

> "IT'S THE BUCK OF A LIFETIME MOST ANYWHERE, I GUESS, BUT A TRULY SPECIAL WHITETAIL IN GEORGIA."

Croft's Georgia buck was a main-frame 10-pointer with matching forked G2s and G3s. With 18 scorable points, it grossed 196 inches.

Croft figured his big opportunity at the buck was gone, and the old whitetail would likely avoid the property where he'd been hurt.

"Then for some reason, the buck came back to us in November," he said. "I was still hunting with the bow, as the rut was starting to build. I saw the buck several times, but he was always out of range. Finally, I decided I'd start taking the rifle.

"On the morning of Nov. 12, it was very foggy, and as it got light, I could see a couple of bucks bowed up over a doe. As I watched them through my binocular, I spotted the big one in the background, bedded. He'd been there the whole time. One of the smaller bucks, a 3-½-year-old, started walking toward me, and I thought, 'This is perfect,' and sure enough, the big one stood up to follow, and while he was standing in some tall grass, I had a good shot to his vitals. When I pulled the trigger, he bucked and ran, and then quickly disappeared. I felt like the shot was good and, sure enough, he had only run about 10 yards."

Obviously thrilled to get a second chance at a buck of a lifetime, Croft was pleased for another reason.

"The buck was not doing well after the arrow wound," he said. "He'd lost a lot of weight, and it didn't seem like he was participating in the rut. He might have recovered, but you never know, so I was really happy to get another chance."

Croft's Peach State monster was a main-frame 10-pointer with matching forked G2s and G3s. With 18 scorable points, the Georgia giant grossed 196 inches B&C.

"It's a buck of a lifetime most anywhere, I guess," Croft said. "But a truly special whitetail in Georgia."

NEXT-LEVEL MANAGEMENT

A 196-inch buck taken anywhere can be something of a lightning strike, but the management plan Croft oversees seemed destined to produce such a giant.

"I've been managing this property since 2014," he said. "We have a group of eight like-minded hunters who are serious about whitetail management and are fortunate to have some good neighbors who largely think the same."

The Georgia property covers 7,000 contiguous acres, 120 acres of which is devoted to food plots. "One of our biggest hurdles is poor soil," Croft said. "We've got plenty of that red clay, and it's not unusual for our pH to start off at 4.8 to 5.2 on many of our plots. So, it takes a good bit of lime to get that soil built up to acceptable levels. Although it's something we commit to every year, it's

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a constant process you can never let up on. While we plant beans as a summer crop in some plots, the cornerstone of our program is Whitetail Institute Clover, Fusion and Whitetail Forage Oats. Those have been some of my favorites since the beginning."

In addition to supplying ample food, Croft manages habitat on the property.

"This is as critical as food plots when it comes to keeping deer feeling safe and secure, as well as providing natural food sources," he said. "Timber management, as well as prescribed burns, are an integral and ongoing part of our management plan."

Croft's buck seemingly disappeared during 2020 but showed up again in 2021, just in time for the archery opener.

CAMERA SURVEYS: KEEPING COUNT

One of the most important steps in developing a management plan for a property is assessing the deer herd. Croft accomplishes that via annual trail camera surveys designed to identify buck-to-doe ratios and fawn recruitment, as well as nailing down the number of bucks — and their ages — on the lease.

"We conduct our first camera survey in the summer, typically in August," he said. "This is accomplished by placing one camera per 100 acres, each situated over a site baited with whole-kernel corn. Each camera is placed on a five-minute delay and is left on the baited site for three weeks. We typically get over 1,000 pictures per camera during this survey."

After the survey is complete, Croft goes through every picture and identifies bucks and estimates their ages.

"Once we have all the bucks identified and aged, we create a hardcover book that contains at least one photo of every buck on the property and his age," he said. "Lease members can then study the book and become familiar with bucks that are eligible for harvest as they go into the hunting season. Aging bucks on the hoof, especially during a hunting situation, can be very difficult, even for a veteran hunter. The book takes a lot of the guess-work out of the process and allows our hunters to spot a buck from a stand or blind and know exactly the deer they're looking at."

HUNTER INFO: SEASON-LONG DATA

Not surprisingly, the group's approach to hunting the property is anything but haphazard.

"We actually have the entire property divided into 10-acre grid sections," Croft said. "We color-code each grid on a map and record the number of hours each grid is hunted and, of course, the deer seen on each hunt. I'm always reminding the guys to be mindful of their approach to and exit from each stand or blind, in terms of the noise they create as they travel, but also the wind direction. Deer literally live and die by their noses, and they pattern us more quickly than we pattern them. We do our very best to not hunt a spot unless the wind is perfect for that area."

When deer are harvested, the data-mining continues, according to Croft.

"We record body weight on every deer, and we pull a jaw bone for tooth-wear aging, and that goes for does as well as bucks," he said. "It's just as important to monitor the health of your does as the antlered deer, as they're obviously half of the management equation."

Croft described the annual buck harvest on the tract as "relatively light," with an emphasis on killing antlerless deer.

"We adjust our harvest goals according to what our trail cam surveys reveal about population and age structure," he said. "In an average fall, we'll take 75 does and only 15 to 18 bucks, and we've kept that basic ratio for many years. That's resulted in a buck-to-doe ratio that's close to 1-1. Although you hear a lot of guys or clubs claiming they want as many does as possible on their property so bucks will hang around, they're really hurting themselves with a highly skewed buck-to-doe ratio.

"With an unbalanced buck-to-doe ratio, the rut you experience is far less dramatic and exciting, as bucks simply don't have to work very hard to find a doe. When you hear guys talking about a trickle rut — one that doesn't exhibit a lot of buck activity — that's usually what's happening. Conversely, we have a pretty amazing rut hunt here. You'll see chasing and fighting, and hear grunting and snort-wheezing. It's the kind of rut hunting lots of guys travel to Iowa or Kansas or Texas to experience, and we have it right here at home."

HARD WORK MEANS POSITIVE RESULTS

Obviously, producing a 196-inch 5-½-year-old buck is not going to happen every year, even on the best-managed tracts. But Croft insists his incredible 2021 buck is proof that the process is worth it.

"We just have so much fun doing the hard work, and the bucks we harvest are the benefit," he said. "The property has produced multiple bucks in the 170s and 180s, and my personal best before this buck was a 177-inch bow kill. We have a great group of guys who've bought into the management plan and enjoy working hard to do everything we can to provide everything a whitetail could need on the place. It's a long-term effort that brings us all a lot of fun and satisfaction."

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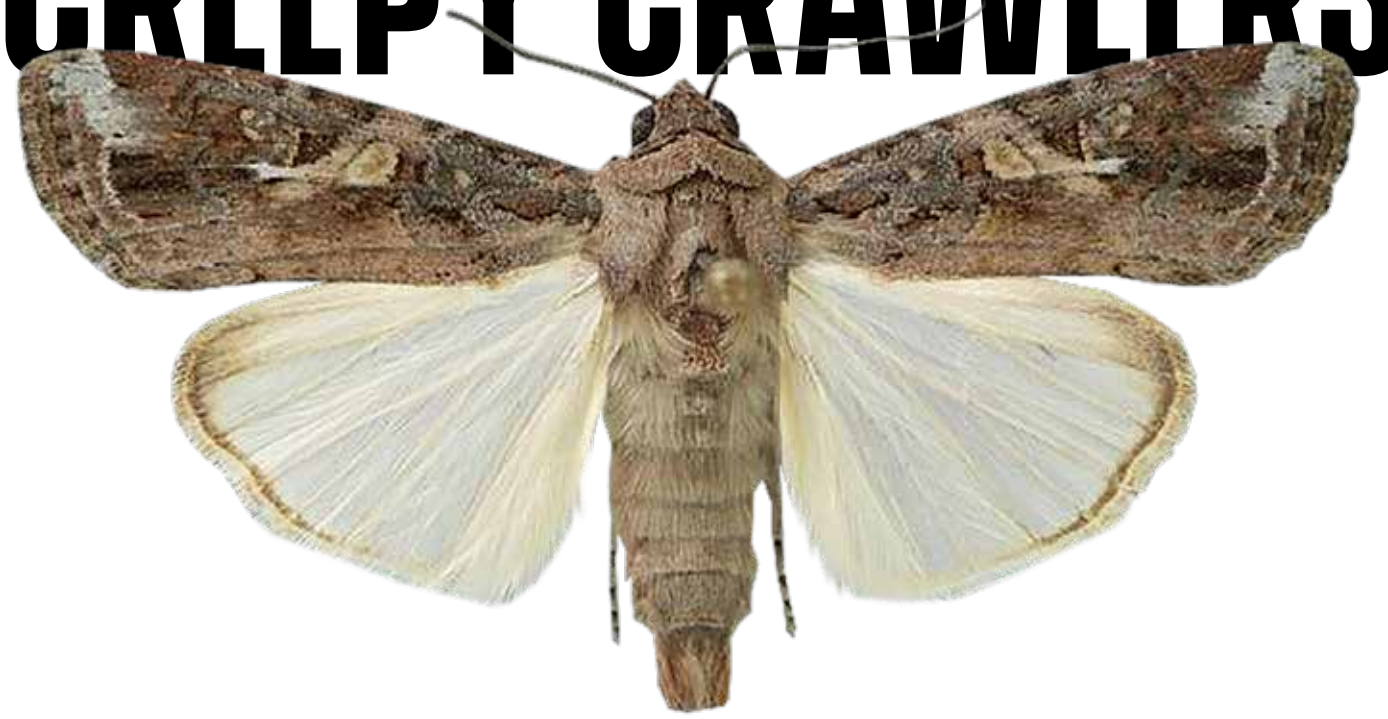
■ Here's the adult stage of a fall armyworm. The moths are nondescript and weak flyers, often carried long distances by wind and storms. These moths lay clusters of small eggs on grasses.

FALL ARMYWORMS:

ATTACK OF THE CREEPY CRAWLERS



In 2021, many food plotters learned the hard way about this common pest. That prompted an obvious question: How can you combat this foliage-eating bug?

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

As a child in the mid-1960s, I had three very enjoyable toys: Jarts, which were lawn darts with pointed metal tips; Clackers, which were super-hard acrylic spheres connected by a string; and a Creepy Crawler set, which used a liquid goo squirted into molds shaped like various critters and then cooked on a tabletop heating unit to solidify the goo.

The set started my interest in insects, and many years later, I earned an undergraduate college degree in entomology. Too bad Jarts, Clackers and Creepy Crawlers were banned because of safety concerns. Whenever I hear enlightened people complaining about children drinking from a lawn hose, I think of Jarts, Clackers and Creepy Crawlers — banned staples of my youth, which I survived and during which I thrived.

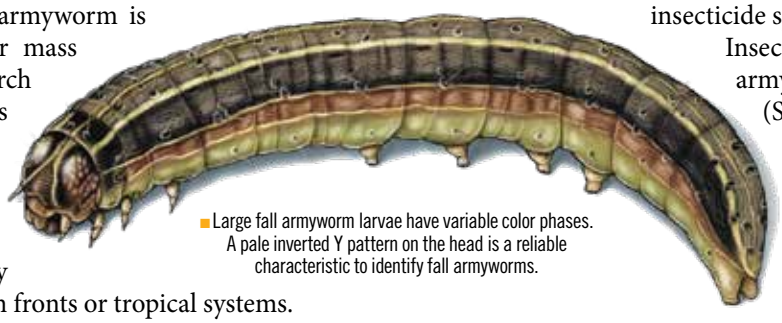
Many insects feed on crops, including fall armyworms, and their presence generates considerable attention. Fall armyworms are foliage eating caterpillars (called larvae) of a nondescript moth. There are several species of armyworms, and the fall armyworm periodically appears in large numbers capable of devouring the foliage of crops. During summer and early fall 2021, much of the country experienced a major — sometimes described as unprecedented — outbreak of fall armyworms, and the insects inflicted significant damage on lawns and food plots. Its preferred food sources are grasses, including bermudagrass, corn, millet, grain sorghum, cereal grains and grassy weeds. However, fall armyworms also feed on many annual crops, such

as soybeans, peas and many brassica crops. Although they prefer grasses, fall armyworms move en masse to other food sources when nearby grasses are consumed. That mass migration (that is, a march) is the root of the name fall armyworm.

The 2021 outbreak prompted increased awareness about the pest and also raised questions on how to deal with them.

LIFE CYCLE

The fall armyworm is a common, regularly occurring pest in the coastal regions of the southern United States, where it overwinters. There are multiple generations of fall armyworms in the South and progressively fewer generations farther north. The insect does not survive winter in Northern latitudes, which explains why the fall armyworm is only an occasional pest. Although the fall armyworm is known for the spectacular mass movement of larvae in search of food, such movements occur for short distances. Infestations of armyworms outside the South are likely because of weak-flying adult moths carried by winds associated with storm fronts or tropical systems.



Large fall armyworm larvae have variable color phases. A pale inverted Y pattern on the head is a reliable characteristic to identify fall armyworms.

Adult fall armyworms (the moths) emerge from pupae (an inactive stage) buried in the soil. The moths are small, gray and basically nondescript. Swarms of moths lay thousands of eggs on green plants, usually grasses. Within 48 hours, larvae hatch and immediately begin feeding. As the larvae grow, they progressively shed their exoskeleton (skin). When the larvae are at maximum size, they burrow into the soil and pupate. The time from newly hatched larvae to pupation is two to three weeks, with temperature affecting the rate of development. The pupal stage is basically a state of dormancy until conditions stimulate adult moths to emerge from the pupae. In summer, the pupal stage can be as brief as two weeks. In fall, the pupal stage can last several months and can be in an overwintering form, assuming the soil does not freeze.

Newly hatched fall armyworm larvae are less than ¼ inch long and are found among grasses close to the soil surface. Color is variable, but young fall armyworm larvae are usually pale green, almost translucent and have a dark head. Young larvae progress to fully developed caterpillars with a maximum size of about 1½ inches long. The color of older larvae is highly variable from light tan, to green and even nearly black. A critical characteristic of fall armyworm caterpillars is a pale inverted Y on the larval face.

Older larvae are more noticeable, obviously because of their larger size compared to newly hatched larvae. Additionally, they are more visible and noticeable because they feed higher on plants. That's often the stage when customers become alarmed by the presence of fall armyworms and feeding damage. Unfortunately, by the time large armyworms are observed, there's already significant feeding damage. Further, large larvae are more difficult to control with insecticides than small larvae. This illustrates the need for customers to closely inspect their food plots for young (tiny) fall armyworm larvae, which are often found close to the soil surface in grasses.

FALL ARMYWORM CONTROL

It's important for customers to regularly and closely inspect their food plots for armyworms, particularly in late summer and early autumn. Focus on forages that are planted in cereal grains, such as Oats Plus, Pure Attraction, Destination and No Plow. Small larvae will be lower in the crop canopy compared to larger worms. When detected, smaller larvae will be easier and more effectively controlled than larger larvae. Configuring a sprayer for high-volume output (sprayer tips with large orifices) will help ensure thorough coverage with insecticide spray.

Insecticide options to control fall armyworms include carbaryl (Sevin) and Spinosad. These insecticides are available without a state-approved applicator's license. Read the insecticide label before use for information on rates and cautionary statements.

This article focuses on the fall armyworm infestations during Summer 2021, but the basic information is the same for other foliage feeding larvae. There are several species of armyworms, along with other foliage feeders, such as corn earworm (also called tomato fruitworm), hornworms and loopers. Although there's variation among these species, the basic life cycle is the same, along with management strategies. It is critical to closely monitor food plot growth during summer and early autumn. Close inspection of food plot forages and treating infestations when larvae are tiny is crucial for effective management.

CONCLUSION

In graduate school, my career path changed from entomology to weed science. A classmate in graduate school had a cocklebur ecology study in soybeans. Specific cocklebur plants, which we sarcastically called pet weeds, were pampered all summer, and the effects of those weeds on individual soybean plants were measured. Tall cocklebur plants began to die in midsummer. A previously unknown or perhaps underappreciated beetle was feeding on the cocklebur plants and was identified as the cocklebur weevil. Because of the importance of that research (especially to my classmate), considerable effort was made to control the cocklebur weevil feeding on cocklebur. Strange things happen when the insect world and weed world collide. I guess it depends on your perspective. Creepy crawlers.

THE ANTLER GROWING CYCLE:

MORE THAN YOU MIGHT EXPECT

Folks often discuss antler growth as a 160- to 200-day period. Actually, managers should think of antler growth as a year-round cycle.

by *Matt Harper*

In sales, you constantly drive toward the last day of the fiscal or calendar year, when you know if you met or fell short of your goal. If you succeed, you'll feel fulfilled as you look back at the effort and hard work it took to reach that point. But then you're unceremoniously pushed off the pinnacle. The next day, you're back at the beginning, facing another arduous climb up the mountain. The only difference is you will likely be asked to climb even higher.

Many things in life are cyclic — continuous processes of beginning, growth, finality and then renewal. Antler growth provides a perfect example, and it's similar to the growing cycle. Both involve many aspects and activities that ultimately determine the final numbers or score, and they're constrained at the top end by ability or market conditions. Reaching that top end hinges on several inputs, all of which must be perfect to achieve maximum potential. Every year, a salesperson is asked to sell more, and each year a buck ages, it naturally tries to grow bigger antlers. Sometimes, it seems like nothing is happening, whether sales aren't increasing or antlers aren't growing. However, there's always activity that will affect the outcome.

HOW LONG IS THE ANTLER GROWING CYCLE?

Some people define the antler growing cycle as the period when visible growth occurs. Depending on where you live, the first signs of protruding velvet antler buds mark the beginning of the antler growing cycle. In many parts of the country, that's late March or April, with growth continuing through spring and summer until early fall, when velvet is shed, revealing hardened antlers. Velvet shedding typically occurs in September, which means about six months have passed from the time the antler appeared to when growth stopped. Quick back-of-the-napkin math indicates that's about 180 days of antler growth, but the actual number varies somewhat, so you often see the growing period listed as 160 to 200 days. Does that mean the antler growing cycle averages 160 to 200 days? Not exactly. That seems contradictory, but a closer look reveals more. The antler growing period is when active growth occurs, which covers a 160- to 200-day period. However, the cycle arguably occurs year-round — a 365-day process. Factors directly affect antler growth when the antler is growing, but others indirectly affect antler growth outside the growing period. Let's examine what happens during each period.

ACTIVE ANTLER GROWTH

Antler growth begins at a small level — so small, in fact, that you cannot see it without a microscope. A layer of regenerative cells on a region of the deer's skull called the pedicle lets the antlers grow every year. Without those cells, antler regeneration is not possible. That's been proven by surgically removing the pedicle, which essentially stops antler regrowth. This also occurs in the wild when a pedicle is damaged, resulting in irregular antler growth or the lack of growth.

Antler growth is controlled hormonally. After the rut, testosterone levels decrease, which causes the eventual shedding of the hardened antler. A slight increase in testosterone occurs in late winter and early spring, triggering the beginning of antler growth. Then testosterone levels decrease until early fall. Testosterone levels are low during most of the growth period, but hormonal variances are not limited to testosterone, as prolactin and luteinizing hormone are also low during antler growth but peak in winter. Conversely, growth-promoting hormones such as insulin-like growth factors are highest during the peak of antler growth. To go into great detail on

> “THE ONSET OF ANTLER GROWTH PROMPTS AN INCREASE IN NUTRITIONAL REQUIREMENTS.”

hormonal functions and activity would require several articles, but I wanted to provide a few examples to show the effects the endocrine system has on antler growth.

The onset of antler growth prompts an increase in nutritional requirements. Because antler growth sometimes begins before spring green-up, nutritional deficiencies can occur. Studies have shown that nutritional deficits early in antler growth can lead to decreased overall antler size, meaning compensatory gains might not occur after higher-quality green vegetation becomes available. Any lack of nutrition is exacerbated when bucks enter late winter or early spring in poor condition, but we'll discuss that later. During early antler growth, a buck's protein needs start to increase from a 10 to 12 percent protein requirement in winter to 18 percent or more during antler growth. That's partly driven because additional protein is needed to build the growing antler. Energy requirements and mineral and vitamin needs also begin to increase. When early spring rolls into late spring and summer, the antler growth rate begins to peak. Protein requirements remain at 18 percent or more as collagen continues to form the antler structure. Collagen is the most prevalent protein in an antler and essentially forms a matrix, or framework. Analysis of a growing antler will show that it can be as high as 80 percent protein. Mineral needs also increase in late spring and early summer in preparation for antler mineralization (hardening). It's often thought that minerals consumed and digested by bucks are transported directly to the antler. Actually, minerals in growing antlers are taken from the skeletal system and transported via the bloodstream and velvet of a growing antler to be deposited on the collagen matrix. That doesn't mean dietary mineral requirements are not important. Antler growth is secondary to body health and condition, and unless a buck has adequate digestible minerals in its diet, the buck's body will not sacrifice skeletal structure and general health to grow bigger antlers.

As summer turns to early fall, mineralization increases, and in September, a buck sheds velvet to expose a hardened antler. A hardened antler is a little more than 50 percent mineral, and although it consists of several minerals, calcium, phosphorus and magnesium comprise the majority.

THE OTHER PART OF THE ANTLER GROWING CYCLE

When antler growth has stopped and bucks sport a set of hardened bone atop their heads, you might think the cycle is complete. That's partially correct. However, the cycle is not finished, because factors that begin when velvet is shed can affect the next year's cycle. In fact, you might argue that the emergence of hardened antlers is not the end but the beginning.

Remember, a buck will not sacrifice skeletal health to transport more mineral to a growing antler to increase density and mass. That health-over-antler prioritization is not specific to minerals but rather for the entire nutritional plane. Antlers are secondary sex characteristics and will always be trumped by body condition and overall health. If a buck requires nutrients to rebuild its body, it will do that first before shifting them to antler growth. Think of it like a bucket with small holes. As you fill the bucket with water, some leaks out. But only when the bucket is full will most of the water spill as it overflows. Some nutrients — the leaks — will go to antler growth, but only when the bucket of body condition and health are maximized will most nutrients spill over the top and be used for antler growth. During the rut, bucks burn energy by fighting other bucks, and seeking, chasing and breeding does. They are constantly on the move during the weeks-long preoccupation for copulation and can dramatically decrease their body condition. In fact, during the rut, bucks can lose 20 to 25 percent of their body weight, leaving them a shadow of the deer they were in early fall. The end of breeding season coincides with winter, which, at least in most of the country, is the time with the least quality and quantity of nutrition. A buck must regain its body weight and condition via whatever food it can find. That's why older bucks are more susceptible to winter kill. Even if bucks survive winter, they must rebuild their bodies when late winter and early spring arrive before most nutrition can go toward the next set of antlers. That's why I consider the entire year as the actual cycle. Even if antlers are not growing, the availability of nutrition to help grow and maintain body condition and health will affect the antler development the next spring, summer and fall.

MANAGING THE CYCLE

When you understand that nutritional requirements don't disappear because antlers stop growing, you realize the importance of managing nutrition on an annual cycle. Most people know that high-quality, high-protein food plots are important during antler growth. But have you considered how fast green-up occurs with a food plot type? Because antlers often start growing before general green-up, choosing a food plot variety that greens up early will get nutrition to the deer herd sooner. Imperial Whitetail Clover is extremely cold tolerant and always one of the first food sources to green up in spring. Because it's a perennial, Imperial Whitetail Clover is already present and growing, providing protein to bucks weeks or months before annuals planted that spring. Supplements such as Imperial 30-06 and 30-06 Plus Protein are great management tools to help provide the high level of minerals needed for antler growth (where legal). But to fully manage the antler growing cycle, you must also consider the nutritional needs during fall and winter. Planting adequate amounts of food plots such as Imperial Winter Greens and Tall Tine Tubers helps provide the nutrition bucks need to maintain good condition as they come out of winter to begin growing antlers in spring. Where legal, Imperial Thrive can also be used to help supplement bucks during winter.

CONCLUSION

By definition, a cycle is continuous. It never stops. Yearly antler regeneration, growth and maturation is a magnificent phenomenon. But if you want to manage the antler growing cycle, consider all aspects. Just because it's February and deer have temporarily slipped from thought doesn't mean they're not out there and what they're experiencing at that time won't affect the outcome of the cycle in September.

■ Gary Padgett hasn't even scored the buck he called "T6," but the deer was 5.5 years old and had 17 scorable points.

INDIANA SUCCESS:

SMALL PARCEL, BIG BUCKS

With four bruiser bucks in four seasons, Gary Padgett Jr. is proof that smart management and careful hunting pay big dividends.

■ by *Gordy Krahn*

In some respects, Gary C. Padgett Jr. thinks small when it comes to killing big bucks. That is, he does it repeatedly on a 40-acre farm he owns. And he's a prime example of how bigger isn't always better when it comes to managing properties that grow and hold trophy-caliber deer — proof that it's not necessary to own hundreds or even thousands of acres to be successful in the whitetail game. And that's not just because he owns the "right" 40 acres. It's also a result of the work he's done developing and managing that ground.

Like a lot of youngsters, when it came to hunting, Padgett started small and worked his way up — his father a big influence on his initiation.

"My dad wasn't a deer hunter, but he would take me rabbit and squirrel hunting and fishing almost every weekend," Padgett said. "As I got older, a friend and his dad introduced me to deer hunting, and I shot my first buck and doe with a 12-gauge Mossberg 500 almost 24 years ago. Eventually, I was able to buy the farm where I shot those deer and was blessed to share time developing it and hunting there with my dad during his final years.

"Dad was a God-fearing, loving man. He passed away Dec. 19, 2021 — health complications from a stroke he suffered four years ago. His last day hunting was opening weekend of gun season this past fall with my brother. We went to the same property where Dad took us on our first hunt. I have no words to express my feelings but was very blessed to share those memories with my dad."

RECIPE FOR SUCCESS

Padgett's formula for managing the properties he hunts isn't complicated. He simply gives resident deer everything they could want or need.

"I plant acres of beans, corn, clover, alfalfa — the list goes on and on," he said.

"Basically, I want to give them a buffet. My goal is to provide them with food they might not find elsewhere."

Padgett delivers the one-two-three punch of food, water, and minerals to keep his deer fat and happy. In addition to the corn and beans he plants on the property, he implements a variety of Whitetail Institute products to round out the smorgasbord.

"My farm is roughly 40 acres," he said. "About 13 acres of it is hardwoods, and the rest is an old agricultural field, [some of it] transformed into food plots."

In those plots, Padgett plants a combination of Imperial Whitetail Clover, Alfa Rack Plus, Pure Attraction and the chicory blend Chic Magnet, which he says deer really like.

Imperial Whitetail Clover contains an extremely high protein content critical for antler, muscle, and bone growth in bucks. Whitetail does use the much-needed nutrition to help deliver healthier fawns and produce more milk. Alfa Rack Plus is a perennial designed to produce an extensive deep-root structure that helps plants thrive on hilltops and hillsides. It features grazing alfalfas that are high in protein, are drought- and cold tolerant, have more leaf relative to stem, and are more palatable to deer than ordinary hay alfalfas. An annual, Imperial Pure Attraction provides abundant, nutritious forage for fall and winter that grows rapidly and is extremely attractive to deer in the early and late hunting seasons. Chic Magnet, an attractive, drought-resistant, perennial forage with incredible attraction power, can be planted alone, mixed with other seeds or overseeded into existing forages to provide gains in variety, attractiveness, and drought resistance.

Mineral sites laced with Imperial Whitetail 30-06 complete Padgett's deer buffet. This mineral/vitamin blend delivers essential macro and trace minerals along with vitamins A, D and E, which are needed for a healthy herd and for bucks to reach more of their genetic potential in antler growth. It contains high-quality minerals and vitamins and, according to Padgett, is a deer magnet. "I added mineral sites on the farm several years ago, and it has really made a huge difference," he said. "The 30-06 is a big draw. The season here in Indiana ends Jan. 31, so I don't start putting mineral sites out until February, and I do that the first of every month until the following season. By Indiana law, I have to pull my mineral sites for hunting season."

But the final piece to the puzzle is that Padgett keeps human activity to a minimum on the properties he hunts in the form of deer safe zones. "I have some sanctuaries that particular bucks go into, and that's where they live and where they bed," he said. "I consider this is a no man's land — stay out of it, no

questions asked. I realize that a lot of these deer don't live here on my property, [but] sometimes they do. They're free ranging, and they come and go, and it's something you can't control. But if I keep the pressure off of them and don't overhunt it, I stand a better chance of them sticking around."

Padgett watched T6 feed in food plots all summer before getting to hunt the buck in September 2021.

Padgett said he can't control what his neighbors do, but by providing a deer a safe house, external hunting pressure can actually work to his advantage. "It's tough," he said. "I do have some hunting pressure, and not everybody's on the same page when it comes to deer management, so on my small parcel, I try not to put pressure on [the deer]. I have the food. I have the water. I have the minerals. And I have the sanctuary. Everybody else is pushing them off their property, and I benefit from that."

CATCH 'EM EARLY

Padgett said the early season is a good time to catch bucks unaware. "I like to hunt them early, when they're still in their summer pattern," he said. "It's the best window of opportunity — that and the last week of November."

And for Padgett, that usually means targeting a specific buck — one that's been frequenting the food plots and mineral sites he monitors with trail cameras.

"So once I start seeing a particular buck that I want to go after, he goes on my personal hit list, and that's the one I focus on."

In 2020, Padgett had connected on a huge buck he called "Big Leu." So, when the 2021 bow season rolled around, there was no reason to doubt he had a good chance to repeat, having gathered a lot of intelligence on a hit-list nontypical buck he named "T6" because of its funky brow tine configuration. "I watched this deer all summer long in the food plots and at a mineral site," he said. "I knew exactly where he was [spending his time]. I knew how he lived, and just like Big Leu, I knew his exact patterns."

On the morning of Sept. 19, 2021, Padgett sat perched on a ladder stand overlooking an area between a creek and the buck's bedding area. "Actually, I wasn't even going to hunt this stand that morning because the wind direction wasn't right," he said. "But it changed overnight, so I went in and set up, knowing where T6 typically liked to bed. It was a nice cool, clear morning. The temperature was probably in the 50s. I had a pretty good idea where this buck was traveling from food to bedding, and that there was good potential that he would show up."

At daybreak, a bachelor group of four bucks appeared. "One was about 110 inches, and the others were scrubbers," Padgett said. "They were just messing around, doing what they do." But then movement to the side caught the hunter's eye.

"I was just watching those four bucks, and then all of a sudden, my hit-list buck shows up," he said. "This really surprised me because I hadn't seen him with those other bucks before on camera. T6 just walked around the corner and started sparring with one of the other bucks."

As the huge buck walked in, Padgett waited patiently for a shot opportunity, which finally came when the buck closed the distance to 41 yards. "When T6 came around the corner, I knew exactly what he was," he said. "I waited for a broadside shot, drew back my bow and made the shot."

Including Big Leu the previous year, T6 in 2021, a buck named "Big 11" in 2019 and a huge 8.5-year-old called "Tank" he shot during 2018, Padgett has killed four trophy bucks in four years. And what does the Indiana hunter consider a trophy buck?

"To be honest, I haven't even scored T6," Padgett said. "I used to get caught up in that, but I've kind of gotten over that stage of deer hunting. I know what a trophy is — what a mature buck is — and that's what I look for. This particular buck was 5.5 years old and had 17 scorable points. When I saw him this year, he really grabbed my interest, and I focused on him during the early bow season."

For Padgett, hunting whitetails is more about the experience than inches of antler.

"As a hunter, I am very passionate about everything I do," he said. "Bowhunting, deer management, building food plots and helping friends who have those same dreams of killing big bucks — that's what matters most to me."

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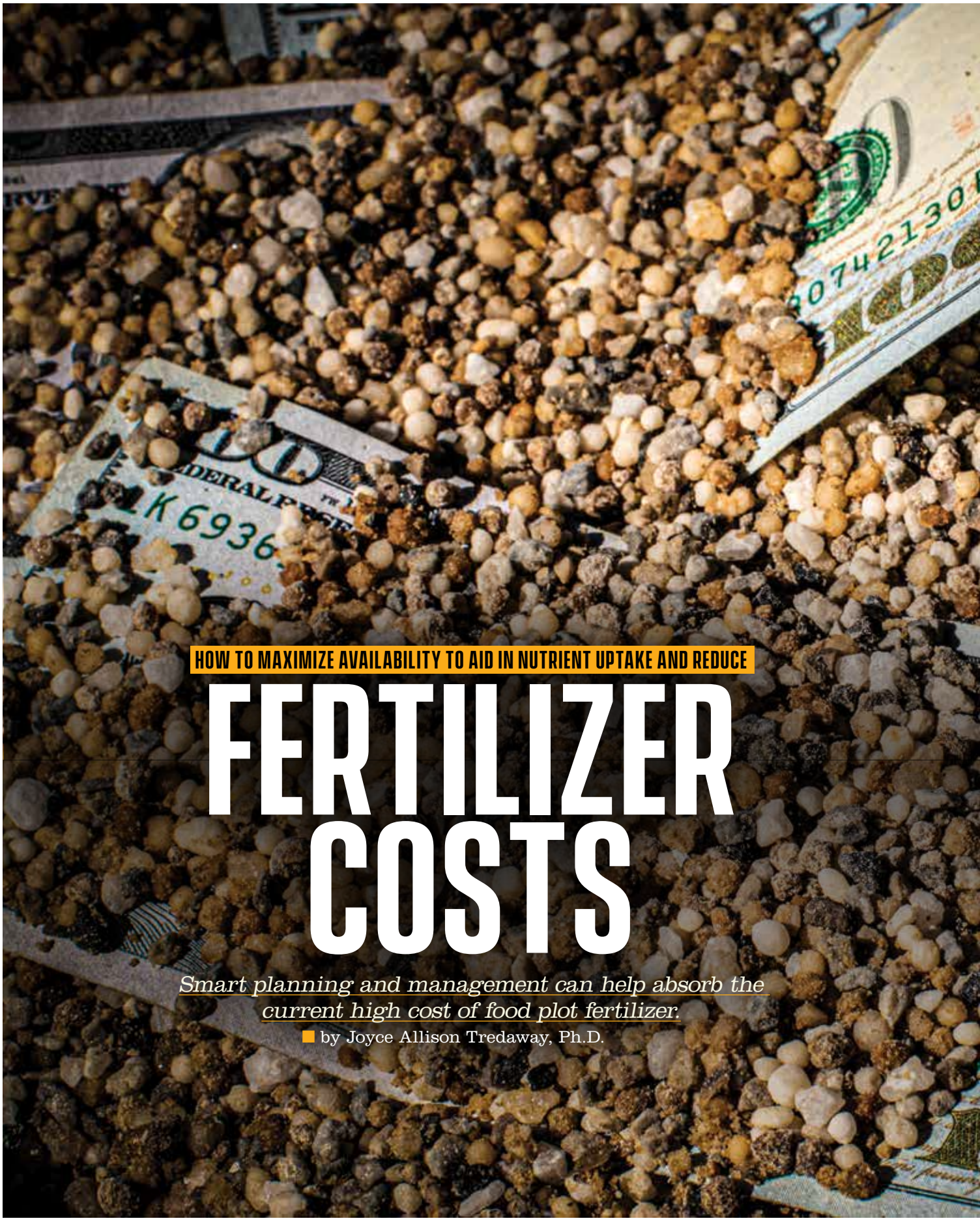


HOW TO MAXIMIZE AVAILABILITY TO AID IN NUTRIENT UPTAKE AND REDUCE

FERTILIZER COSTS

Smart planning and management can help absorb the current high cost of food plot fertilizer.

by Joyce Allison Tredaway, Ph.D.

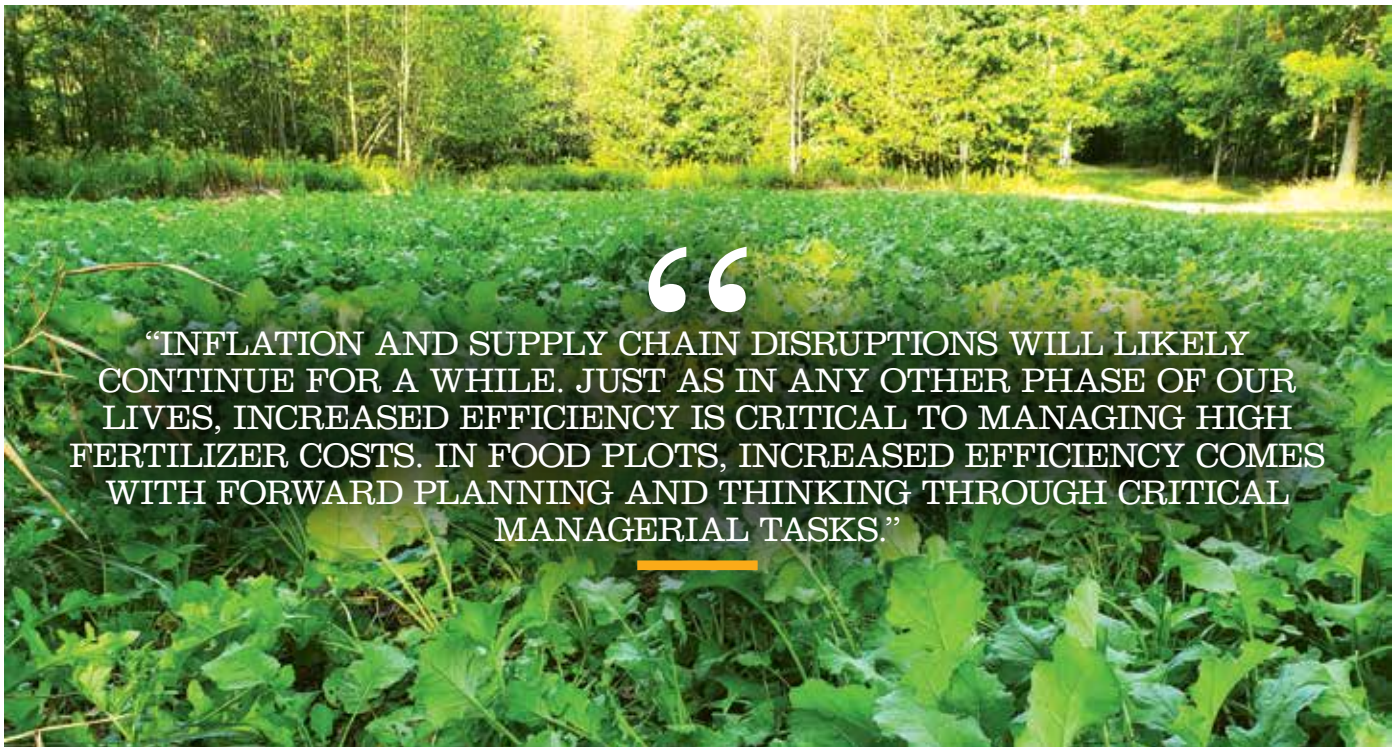
As we seek relief from higher prices at the pump and grocery store, we won't find that with fertilizer for food plots.

Potash is near an all-time high of $800 per ton, according to a Mississippi State study released in March. In addition, continuing supply chain disruptions have caused the main chemicals in fertilizer — nitrogen, phosphorus and potassium — to increase since Spring 2021. A bag of fertilizer that sold for $11 in 2021 now sells for about $20. With such price increases, it's important to maximize nutrient availability and reduce fertilizer costs wherever possible.

PROPER PLANNING

A soil test is the basis of all fertilizer and lime applications. Basing your fertilizer decisions on a soil test report ensures that you're only applying the nutrients needed, because soil testing laboratories provide quality analysis on soil fertility status. The soil test lab at Whitetail Institute is unique in that it makes fertilizer recommendations based on the seed product you intend to plant (that is, PowerPlant, Extreme, Beets and Greens or others). University laboratories have no idea what these blends include, so their recommendations are based on the closest forage.In addition, correct (decrease) high soil acidity by liming to increase soil pH. Really, the main goal of liming is to neutralize the toxic elements that occur during high acidity — especially aluminum and manganese — while improving the availability of desired elements.

Acidic soils also affect the availability of nutrients plants can access. Regardless of how much fertilizer you apply to an acidic soil, those nutrients are not available to plants. Liming also increases the availability of phosphorus, molybdenum and boron while promoting microbial growth, development and processes, which helps produce nitrogen in legumes by biological nitrogen fixation.



Finally, limestone is a cheaper input than fertilizer, which improves efficiency.

Be sure to know the size of the area to be fertilized. Having the correct measurements of field(s) to be fertilized prevents overfertilization and wasting money. Whitetail Institute's new PlotPerfection app aids in this. It's a one-stop app for measuring a field and putting in inputs, such as fertilizer, lime and sprays. Soil test reports from Whitetail Institute's laboratory can be synced with PlotPerfection, which simplifies efficient soil fertility management in your food plot.

The fertilizer calculator in PlotPerfection lets you mix and match fertilizers. For example, if you want to purchase 46-0-0, 0-40-0 and 0-0-60 to get an exact amount, the calculator will tell you how many pounds of each are needed to achieve the amount recommended. Fertilizer recommendations are given in pounds per acre or pounds per square foot. Use whichever is appropriate for your food plot. A useful conversion is that 1 acre equals 43,560 feet squared.

Properly calibrate your fertilizer spreader so it only applies the amount needed. This is a trial-and-error system. Determine how many bags of fertilizer you need for a food plot. For rotary spreaders, open the gate a small amount, and observe the flow rate. Multiple passes with a rotary spreader set at a small gate opening are better than fewer passes using a more open gate. Spread fertilizer in a serpentine pattern, and repeat in a perpendicular direction.

DON'T GUESS

Not using a soil test will leave you depending on guess work, which can be wasteful and costly. Randomly using one blended fertilizer for all forages and all food plots without a soil test is an example of costly waste. For example, nitrogen in a blended fertilizer is not needed for clover or alfalfa. So why apply a nitrogen blended fertilizer where it will not be used?

For forages that need supplemental nitrogen — such as brassicas, cereal grains and sugar beets — consider split fertilizer applications. Split applications simply involve applying half of the recommended fertilizer rate before planting and the other half 30 to 45 days later. This is more efficient compared to one preplant application and is standard practice in conventional agriculture. In addition, rather than using blends such as 10-10-10 or 13-13-13, use fertilizer dealers that might have blends more appropriate for forage crops and soil fertility stature. Prioritize macronutrients — nitrogen, phosphorus and potassium — over micronutrients. If your food plots contain a forage that needs nitrogen, that's the nutrient that will provide the greatest return on investment and is generally the most limiting.

The need for phosphorus and potassium depends highly on management philosophy. A soil can contain enough of each nutrient (particularly phosphorus) that it might be easier to cut down on phosphorus and potassium than nitrogen or sulfur, which readily leach from the soil in their crop-available forms.

Increased fertilizer costs are another reason to consider establishing perennials — such as clover, alfalfa or chicory — which use less nitrogen and are cheaper to grow during the current economic conditions. This is a great option in areas where weeds won't be a limiting factor.

Manure and litter can provide a valuable source of nutrients and is abundant in many parts of the country. Strive to maximize the efficiency of the nutrients in manure or litter to reduce the amount of supplemental fertilizer required.

Inflation and supply chain disruptions will likely continue for a while. Just as in any other phase of our lives, increased efficiency is critical to managing high fertilizer costs. In food plots, increased efficiency comes with forward planning and thinking through critical managerial tasks. Fortunately, technology — such as PlotPerfection — can help, particularly with fertilizer use.

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■ Vitamins might not share the nutritional spotlight with minerals or protein, but their absence causes diminished results.

VITAMINS:

THE FORGOTTEN COMPONENT

Folks don't often mention vitamins when discussing deer nutrition, but that doesn't mean those compounds aren't important. In fact, they play vital biological roles.

■ by *Matt Harper*

When watching football, where does your attention focus when the ball is snapped? I'd guess 99 percent of us focus on the quarterback and then the running back or receiver, depending on the ball.

The ball is the focal point because its progress marks the success of a play. Unless you're a broadcaster or played the game, you likely don't think much about the right offensive guard unless he pulls to lead a left sweep. Even if he misses a block, scrutiny only develops during the replay, when the world watches his failure in slow motion. Still, most fans would say the offensive line is fundamental to a team's success. No matter how good the skilled players are, it takes an entire team to win consistently. That might sound like a corporate slogan, but it's true. In fact, I would say it's the rule more than the exception.

The concept of multiple components working together to achieve an outcome can be seen everywhere and in everything. Nutrition provides a perfect example of various parts and pieces combined in exact amounts and ratios to achieve optimal growth and production. Protein is important, but without proper levels of other nutrients, the result is suboptimal. Proper mineral nutrition is critical, but other micro nutrients play a role in balanced nutrition — including vitamins.

The role vitamins play in deer nutrition often falls to the bottom of the list of hot topics. In fact, it typically doesn't make the list. Supplemental vitamins typically find their way into deer nutrition via deer feed, pellets or mineral, none of which promote vitamins as a component. If you asked someone what was in their deer mineral, they might say calcium, salt, copper and other minerals, but few would say vitamins. After all, people call them deer minerals, not deer minerals and vitamins. But although they receive little acknowledgment, vitamins play a vital role nutritionally and biologically.

WHY SUPPLEMENT VITAMINS?

People often debate the need to provide nutritional supplements to wild, free-ranging deer. Through the years, supplemental protein, in the form of food plots or feed supplements, has been recognized as benefiting the nutritional plane of deer. To a lesser degree, mineral supplementation has also become a standard practice. Although vitamins are typically a component of those practices, their importance is seldom discussed. Some argue that supplementation is not necessary for any nutritional component, because deer have survived solely on natural diets since the beginning of their existence. There's no way to argue that, but the question involves deer simply surviving versus maximizing their nutritional health. I've tackled this question several times because it's the basis for supplementation. Growing bigger bucks with larger antlers is the most common objective of improving nutrition. Even folks who scoff at the idea of growing trophy bucks should realize that better nutrition benefits does, fawns and younger bucks, essentially improving the nutritional health of the entire herd. Liken it to human nutrition. We take supplements because our diets are typically deficient in some nutrients. Could we compose a diet that comprises all the essential nutrition we need in the appropriate amounts? Possibly, but what's the likelihood of that happening every day? So we take supplements to shore up deficiencies. Normal people are not professional athletes who require more and better nutrition to let their bodies perform at high levels. But all deer are athletes, and the better their nutrition, the better the athlete.

WHAT ARE VITAMINS?

Vitamins are defined as any group of organic compounds essential for normal growth and nutrition, and that are required in small quantities in the diet because they cannot be synthesized by the body. Therefore, vitamins are a nutritional requirement because they cannot be produced in sufficiently large quantities by an organism for proper metabolic function. Although vitamins are a relatively recent discovery, people have long been aware of unknown factors derived from food that seemed to help prevent debilitating conditions. Centuries ago, observers realized fresh fruit — especially oranges — could prevent scurvy. That was especially evident on long ocean voyages, where perishable food could not survive long in ships' stores, so diets consisted of limited preserved foods. Sailors didn't know a vitamin C deficiency in their diet was causing scurvy and that fruit provided vitamin C to prevent it. They simply knew that if you ate fruit, you wouldn't experience the condition.

Until the discovery of vitamin chemical compounds, the four dietary components deemed essential were protein, carbohydrates, fat and minerals. However, when scientists discovered that certain conditions such as scurvy were not germ- or disease related but rather appeared to be tied to diet, research began to isolate specific nutritional components responsible for dietary deficiencies. The discovery of vitamins occurred about the turn of the 20th century, when chemical compounds were isolated and recognized as vitamins. In 1912, Casimir Funk coined the word vitamine. The first vitamins to be discovered were vitamins A and B1, also known as thiamine.

FAT-SOLUBLE VERSUS WATER-SOLUBLE

Vitamins are classified in two groups based on solubility: fat-soluble or water-soluble. Water-soluble vitamins, as you might expect, are soluble in water and consist of B vitamins, such as thiamin (B1), riboflavin (B2), niacin (B3), pyridoxine (B6) and others. B vitamins serve critical nutritional roles but are typically not supplemented in ruminant diets because they're produced in the rumen via microbial fermentation. Also, vitamin K (which is actually a fat-soluble vitamin) is also produced by microbial activity in the rumen.

Fat-soluble vitamins include vitamins A, D and E, which are also known as antioxidants. Antioxidants help inhibit oxidation, which can produce free radicals, scavenging for electrons and damaging cells. Fat-soluble vitamins are soluble in lipids (fat), and unlike B vitamins can be stored and built up in the body. Vitamins A, D and E cannot be produced in the rumen, so people typically supplement them in ruminants, such as deer.

“

“THE BETTER THE NUTRITION, THE BETTER THE ATHLETE.”

FUNCTIONS AND DEFICIENCIES OF VITAMINS A, D AND E

The most commonly recognized function of vitamin A (retinol or retinoic acid) is the role it plays in vision — especially night vision. Centuries ago, consuming liver was recognized as a way to improve night vision because of the high amounts of vitamin A in liver. You've also heard people say to eat carrots to improve your vision, because carrots contain beta-carotene, which is a precursor to vitamin A. Vitamin A has other functions, including the maintenance of epithelial tissue (skin) and maintenance of mucus membranes, and it's important in reproduction. Vitamin A also plays a role in bone development and is therefore involved in antler growth. Signs of deficiencies in vitamin A can include blindness, fetal abortions, decreased body weight, abnormal bone growth, increased susceptibility to infections, and rough or poor-quality skin and hair coat. Fawns born to a vitamin A-deficient doe can be weak with a decreased chance of survival.

Vitamin D is most commonly found in vitamin D3 in supplements. Vitamin D has multiple functions, including immunity and bone development. Calcium is the main mineral in antler and bone structures, and vitamin D is involved in the calcium transportation to bones and growing antlers via the blood stream. It's also important for lactation. Deficiencies in vitamin D often manifest in convulsions, stiff joints, decreased lactation, general weakness, and weakened bone and antler structure.

Vitamin E plays a major role in supporting a healthy immune system and is also important in reproduction. It's also involved in the control of nerves and muscle contraction, affecting physical movement and internal muscle functions, such as heart, lung and rumen function. The most common symptom of vitamin E deficiency is white muscle disease, which is essentially a form of muscular dystrophy. Other vitamin E deficiencies include depressed immune function, leading to a greater propensity for disease contraction, and reproductive problems in does and bucks, which can lead to lower conception rates.

VITAMIN SUPPLEMENTATION IN DEER

The common form of vitamin supplementation involves including them in a free-choice mineral (mineral/vitamin) or pelleted feed or supplement. As mentioned, vitamins A, D and E are most common in supplementation products, as those vitamins are not produced in adequate quantities to meet full requirements. Because B vitamins are produced in the rumen, they're typically not included in deer products or most ruminant products, including cattle minerals and supplements. In high-producing dairy cows, B vitamins are sometimes added to meet extremely high nutritional demand, but in the form of bypass B vitamins, meaning they're protected and pass through the rumen to the small intestine.

Simply providing vitamins A, D and E in a free-choice mineral doesn't tell the complete story of proper nutritional supplementation. First, those vitamins must come from high-quality sources. Vitamins can degrade through time, causing decreased efficacy, especially in the presence of minerals. Poor-quality vitamin sources are far more susceptible to degradation. Proper formulation levels are also important, not just in quantity but also in ratios to one another. Quantity and ratios affect maximum digestion and usage by deer.

Whitetail Institute recently introduced the new and innovative Antler Up D3 addition to its Imperial 30-06 and 30-06 Plus Protein products. That's a perfect example of getting the right levels of vitamins in a product to maximize results. As noted, vitamin D is vital for antler development, as it's involved in mineral transport, specifically calcium. Researchers at Whitetail Institute developed Antler Up D3 to ensure proper D3 functionality and make sure there are no deficiencies that might lead to decreased antler growth.

SUMMARY

Nutrition is a complex science, and even with the discoveries of the past century, it still involves unknowns. Before vitamins were identified, people simply knew they needed to eat certain foods to avoid various conditions. Researchers of human and animal nutrition will continue to unravel riddles and make discoveries. But it's important to understand that some nutritional factors, no matter how small, are vital for maximum nutrition. Vitamins might not share the spotlight with minerals or even protein, but their absence causes depressed results. Often, you might not see a vitamin deficiency in a deer herd. But that doesn't mean it doesn't exist. If you want to provide the highest level of nutrition to deer, leading to better health and productivity, you must meet all nutritional needs — even small ones.

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START SMALL, GROW BIG

The author began with a tiny plot but has increased his efforts to a far grander scale. Using his lessons, you can achieve similar success.

by *Gerald Almy*

When I started food plotting, the industry was just getting revved up with Ray Scott's introduction of Imperial Whitetail Clover — the first forage designed to attract and nourish deer. I was a fanatical deer hunter. I liked to do habitat projects for wildlife, especially whitetails. And I made my living as an outdoor writer.

Getting into food plots seemed a natural development that would blend those. However, as a free-lancer in the early stage of my career, I had little spare cash and, more important, little land to plant in food plots. In fact, I owned just a little more than an acre.

Never mind that. I was going to give food plotting a try.

The acre-sized plot where I lived in a small cedar cabin was tucked at the end of a private dirt road, in good deer territory in western Virginia. In fact, Shenandoah County had produced a previous state-record 188 net typical. Genetics like that and the isolation of my land were pluses I hoped might compensate for the tract's small size.

Using a garden tiller and hand-crank seed spreader, I got started. Like many first-time food plotters with modest income, I skimped on seed at first, trying generic wheat, rye and clovers. Those efforts attracted a few does and an occasional spike or fork-horn.

Eventually, though, I tuned in to what Whitetail Institute was doing and began planting Imperial Whitetail Clover. In fact, I wrote Scott as a mostly unknown outdoor writer and still cherish the friendly, encouraging letter he wrote back.

My tilling wasn't deep, my weed control was poor, and the acre of ground was just a place deer passed through in their travels to larger farms nearby, but that Imperial Whitetail Clover patch eventually attracted several 2-year-old bucks that stopped to munch on the tender, high-protein plants. Even one 3-year-old visited the plot — a deer I proudly took as my biggest whitetail ever at the time.

FROM HUMBLE BEGINNINGS

That wasn't bad for a 1-acre plot and a budding food-plotter. But just as I hoped my career would grow and expand from local newspapers and regional magazines to bigger markets such as Field & Stream and Sports Afield, I knew my life as a food plotter would grow and expand, too. I was determined that I would own more land, plant more and larger plots, experiment with diverse forages,

and create the cover, water sources and bedding sites to make deer feel at home.

That initial site expanded when the elderly man who owned the adjoining 3 acres sold it to me for a bargain. Four acres offered a better opportunity to grow and experiment with new forages from Whitetail Institute. As more article sales and checks permitted, I soon bought an even larger property. Later in my career, I purchased another larger tract in another state to feed my desire to grow food plots.

Through the years, I've owned more than 250 total acres in several states at various times. And every plot planted on those tillable acres was a rewarding learning experience. Now, as I've settled down on the opposite side of the Shenandoah Valley across from where I started almost 40 years ago, I have deer feeding in three food plots visible from my office and living room windows every evening. Other areas are monitored with trail cameras.

That progression and my growth as a food plotter and writer gave me the idea for this article: Start small, grow big.

You don't need a large property to get started and learn about food plotting. Even on small tracts, such as the acre with which I started, you will improve the health of deer. In fact, you don't even have to own land if you have a relative or friend who will let you improve their property with plots or can lease a tract where you can plant wildlife forage.

Whether leased or owned, you don't need an expansive acreage. Start small. Then gradually, as time and money allow, grow big.

That's what I did, and it's been a formula that has worked, producing bucks into the 140 class at times. As your finances improve with raises and better jobs, you can expand your property or purchase a larger tract. Heck, I've been in the low-income level all my life but have owned and grown plots at the aforementioned acreages without sacrificing my family's needs.

SMART SELECTIONS

It's important to choose the right forages when you start on a small piece of land. Some blends from Whitetail Institute are particularly good for smaller acreages or situations in which tractors and top-of-the-line implements aren't available. Focus on those. Then, as you grow into larger properties and more fertile soils, you can expand into more

Wait until you've developed your skills a bit and have larger fields before turning to products such as PowerPlant, which the author is shown with here.

challenging forages, such as PowerPlant. Here is a look at some of the earliest Whitetail Institute offerings I used and more recent offerings that can help newcomers or folks with small tracts. These choices will also depend on factors such as soil quality, the amount of sunlight a plot receives and whether you can get a tractor to the site.

I was fortunate when I began food plotting on my small acreage, as the land was mostly open, and I could get my "power equipment" (a garden tiller) there to work the ground. The soil was also of decent quality and received more than six hours of sunlight daily. That made Imperial Whitetail Clover a good, natural choice. If you have a similar setup, it's difficult to beat the No. 1 food plot seed in the country. You might not get the best clover plot if your equipment is minimal for tilling and weed control, but the plot will still attract and benefit deer. Then, when you get better tools for working the ground and maintaining the plot, and more income lets buy more land and build larger plots, you will find out how miraculous this forage is.

For areas where soil is significantly drier, Fusion is a great alternative to Imperial Whitetail Clover. It features the same proprietary clovers but also includes a special chicory developed by Whitetail Institute to withstand drought and summer heat and be particularly tender and palatable to deer. This plant comes on strong when clover might not thrive because of a lack of rain. The clover won't die. It will come back stronger in fall when rains and cooler temps arrive. Meanwhile, the chicory will keep the deer coming to the plot and take pressure off the clover.

If your land is more shaded and perhaps just a clearing in the woods that only receives a modest amount of sunlight, Whitetail Institute offers No-Plow, Bow Stand and Secret Spot, which are blends of various forages deer find attractive. Further, they don't require you to work the soil extensively beyond perhaps raking it up to loosen the first inch or two of dirt. These plots will also thrive with minimal sunlight (three hours or more).

If you're fortunate to have land that's a bit higher in quality than a typical woods plot, and it receives six or more hours of sunlight per day, Ravish Radish, Tall Tine Tubers and Winter-Greens are top choices to accompany an Imperial Whitetail Clover or Fusion plot. Ravish is more recent introduction, but Tall Tine Tubers and Winter-Greens were important forages during some of my earliest years of planting.

I will never forget the first time I planted Tall Tine Tubers. The deer didn't care for it much right away. That's common in some regions but not in others. But within weeks, the deer on my land changed their minds, as they typically do after they taste this new forage. When I came home from a brief out-of-state hunt, the plot — which deer had barely nibbled on before I left — was almost obliterated. It looked like a bomb had exploded. Leaves were chewed to the ground.

Later, I incorporated Winter-Greens, a

mixture of turnips, kale and other brassicas, and almost all exclusive Whitetail Institute products, into my small-scale food plotting. Planted in late summer to early fall, these forages emerge quickly. And when the deer get a taste for them, they'll flock to your plots within days after the first seedlings emerge. These forages are attractive, high in protein and highly palatable to deer. They also help the soil by reducing weeds and breaking up compacted dirt with their long taproots.

For locations with ample sunlight but low-quality soil or minimal rainfall, Whitetail Extreme and Edge are great products. Extreme contains the proprietary forb Persist and WINA 100 chicory and offers protein levels up to 44 percent. Edge includes a sainfoin deer love, as well as Persist, chicory and a grazing alfalfa. The mixtures can last up to five years.

Destination is a newer product that's perfect for an all-in-one fall offering on better-quality soils. It includes a blend of five plants, four of which are exclusive to the Whitetail Institute, to attract deer from early fall through winter. Early attraction comes from WINA 204 Pea, Alex Berseem Clover and Whitetail Oats. WINA 210 Kale and WINA 412 Radish yield tons of forage during the late season and protrude above snow, attracting and nourishing deer in the heart of winter.

When your land increases to the point you have one or more fields of 2-plus acres that you can devote to one plot, it's time to incorporate PowerPlant into your forage program. This is the stage where you have grown big as a food plotter. Several years after I began growing plots, I took the plunge into growing this blend of warm-season annuals, which is planted in spring. I tried it earlier than I should have, when I had a little less than an acre to devote to it. And the deer taught me a good lesson. Warm-season annuals are highly palatable, and PowerPlant's ingredients are so attractive that hungry whitetails can quickly demolish them on small parcels.

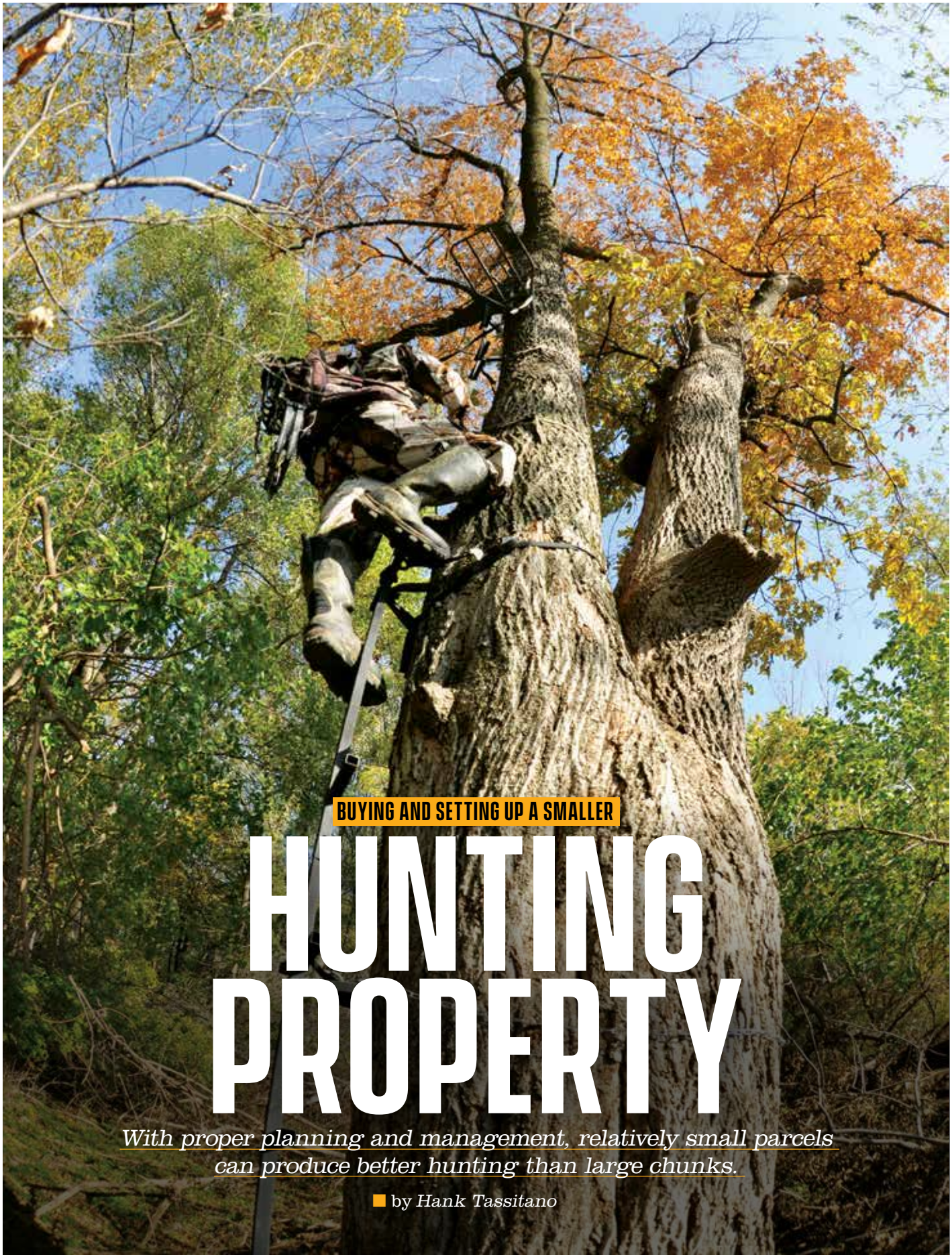
PowerPlant's design reduces that possibility. Sunflowers and sunn hemp act as nurse crops and protect the forage soybeans and peas to some extent by absorbing early feeding pressure. But you still need at least 2 or more acres for a really successful planting of this forage mix.

After I owned enough land to devote 4 or 5 acres to PowerPlant at one site, it was amazing how much forage grew and how much deer loved it. They liked it so much many actually bedded down in it because it grows so thick and offers security cover as well as food during a period when many native plants have declined from their spring peaks.

A LIFETIME OF LESSONS

As a devoted food plotter and outdoor writer, I try every new product Whitetail Institute introduces. I even experiment with products from a few of their competitors, just to see what's available in the field. But the products highlighted here have been my favorite go-to forages. That's true for the early years when I was eking out a tiny plot on a few acres to the 100-acre-plus tracts I've been fortunate to own at various times in Virginia and Texas.

Start small, grow big.

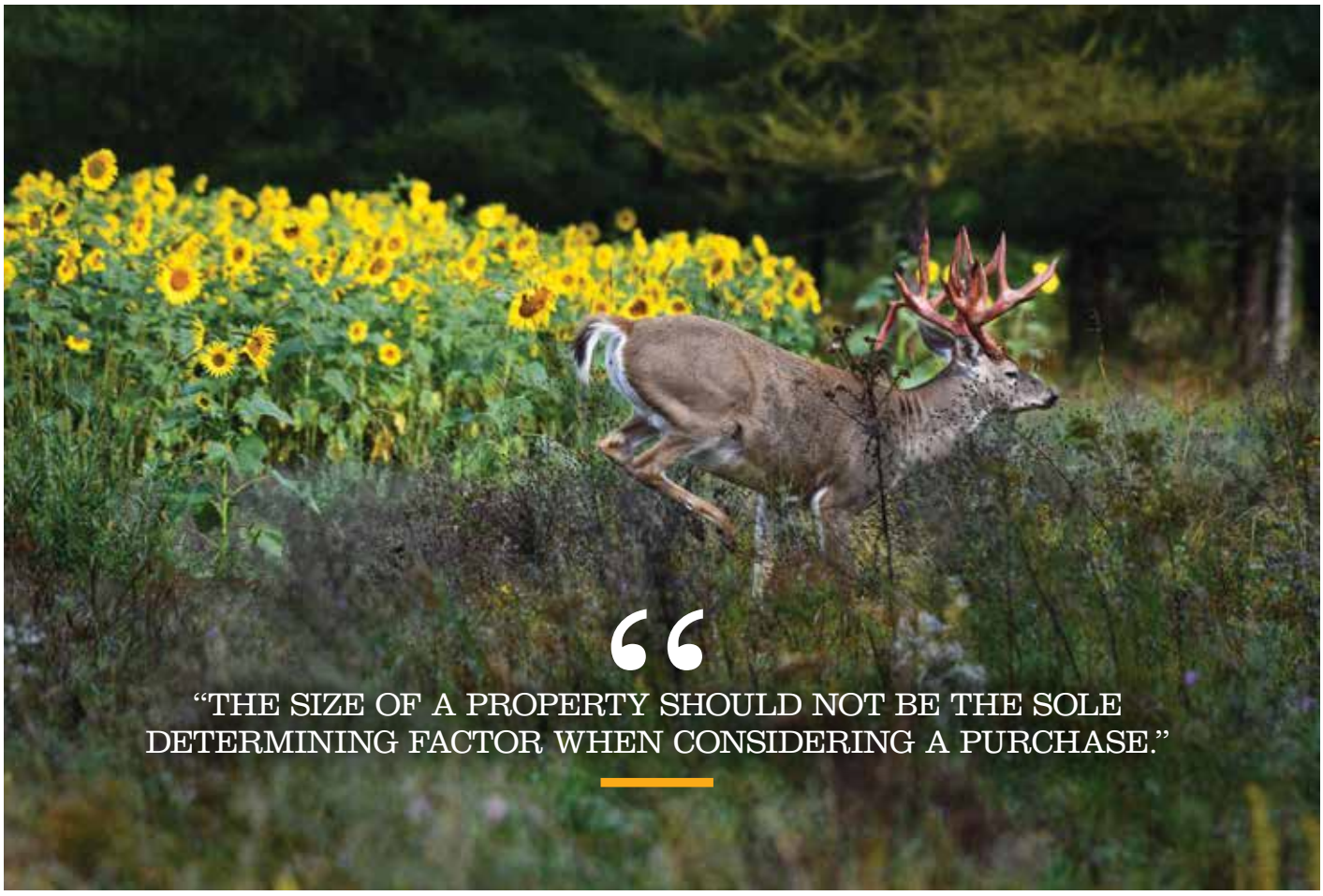


BUYING AND SETTING UP A SMALLER

HUNTING PROPERTY

With proper planning and management, relatively small parcels can produce better hunting than large chunks.

by *Hank Tassitano*



"THE SIZE OF A PROPERTY SHOULD NOT BE THE SOLE DETERMINING FACTOR WHEN CONSIDERING A PURCHASE."

Buying hunting land is exciting but can be daunting. Here are some basic tips.

First, find a realtor who is a hunter, as they'll have a better idea about what you're seeking. Also, the rule about buying a home also applies to purchasing hunting land: location, location, location.

The size of a property should not be the sole determining factor. Some smaller properties can offer better hunting than larger parcels. When you identify a property you like, find out as much as possible about the adjoining parcels. That will help you understand the real potential of a property for hunting.

When you walk parcels, make notes to see if they contain thick cover, open fields, water sources and mast producing hardwoods. These are critical elements for a good hunting property. Also, pay close attention to rubs, deer trails and other signs of wildlife, such as turkey scratching in the leaves.

In addition, think about improvements you might need to make, such as clearing access roads, opening areas for food plots and potential stand locations. You can easily change the dynamics of a property with those improvements. And keep an open mind as you walk the property.

CASE IN POINT

I recently sold a property where I had made those improvements. The work turned a not-so-good hunting property into outstanding hunting land. I owned the place nine years and was amazed how clearing a road system and clearing areas for food plots made such an amazing difference in the abundance of wildlife. My hunting success on mature bucks was high, and longbeards were abundant in spring.

Because this property was set up so well, it increased the selling value substantially. Any improvements you make to your land can bring a good return on investment. My realtor was surprised how much more the property sold for.

I sold this property to downsize a bit, so it was more manageable as the years passed. Also, another area of my state has always interested me for its hunting potential, plus some great fishing. I worked with a local realtor who's a serious deer hunter to find the right land. We walked a few places until we found what I believed had great potential. It had plenty of deer sign, two thick creek bottoms, a couple of big oak ridges and several pine thickets. There was also a 1/2-acre meadow that would make a great food plot.

I let the realtor know I was interested and got permission to walk the property again with a hunting buddy. Two sets of eyes are better than one for a second walk-through. We actually found a lot more buck sign by walking the creek bottoms and ridges. I was more impressed after the second walk, so I made an offer and closed on the 53-acre property.

Then the work began. The first task was to mark with flagging tape where the road system would go, as well as two additional food plots. I planned the locations of my plots so they were close to thick cover. That would let deer feel comfortable using the plots any time of day.

When hunting small properties, having a prime year-round food source is critical to success.

Using the Whitetail Institute Plot Perfection app on your phone can be a great help in getting an overview of a property and help you decide where to place plots and stands. All your soil test results are stored in Plot Perfection as well.

Next, I established a couple of mineral sites to help monitor the deer population and provide vitamins and minerals needed for spring and summer. One day after I set up the sites, deer found them. I had a cell cam at the sites and received photos on my phone daily. At first, does hit them, but as time progressed into early summer, bucks started showing up. It was exciting to see the bucks, some of which had great promise for fall. Plus, because my food plots weren't planted yet, it was a great way to see what deer were using the property.

The next step was to find the right person with a mulcher/grinder to open up the road system and plots. A local man, Gene, had the necessary equipment and knowledge about building food plots. That was a plus, especially with having to open plots up in the woods.

The road system went quickly, and it took a couple of extra days to open the plots. Gene returned with bigger equipment to work up the ground for the planting after summer was finished. That was good, because the soil was mostly clay and rocks. I would have had a tough time with my smaller equipment.

SETTING THE TABLE

When the ground was opened up, I took the most important step for planting food plots: soil tests on all the plots. This let me buy the correct amount of lime and spread it before discing the ground to plant.

Because of the rough soil, I reached out to Whitetail Institute for recommendations about what seed to plant at each plot. That was wise, because the plots were successful. Because the soil had a lower-than-desired pH, Whitetail's representatives also recommended I use Impact, a new product that gives the soil a quick pH boost to jumpstart the plots. I sprayed Impact just before planting.

After planting the plots, the weather turned very dry for almost three weeks. I was worried that would hamper growth, but we finally started to get rain, and the plots grew. It took little time before deer were hitting the plots and eating the lush new growth. With a healthy deer population, though, I was concerned whether my plots were big enough to sustain the browsing. My largest plot is 1/2 acre, and my other plots are only 1/4 acre apiece. My fingers were crossed.

With the plot work finished, it was time to get stands and blinds set up. Because the property was new, and although I'd walked it several times, I relied on trail cameras to help decide where to set up stands and blinds. Having photos from early spring until the end of August gave me a good idea about the location of each stand. From experience, I knew I might need to adjust some of the stands or blinds after a full season, depending on what transpired.

With stands set up, food plots growing and deer using them on a regular basis, we had to wait for hunting season to open. My goal is to shoot bucks 3 years old

“OWNING HUNTING PROPERTY IS A GREAT INVESTMENT AND PROVIDES YEARS OF ENJOYMENT.”

or older, plus mature bucks with weaker antler growth and does to maintain a balanced herd. It's wise to have a plan for your property and let anyone who hunts there know those plans.

Archery season was exciting, as I saw many deer during daylight. Lots of bucks hit my plots during daylight or moved past stands in wooded areas. I felt more confident about my stand locations for the season.

As acorns started falling in October, deer backed off the plots somewhat. Having stands set up for that scenario lets you stay in the game. That's why having oaks on a property is important, as acorns become the main food source when they hit the ground — even if you have lush food plots.

As the rut heated up, my stands and blinds at critical locations — such as oak ridges, creek bottoms and food plots — revealed the activity I'd hoped for. Bucks and does visited those locations during daylight. The trick was picking the right stand.

The first season was a success, as I took a couple of mature bucks and some does. Further, the work I'd put into the property was paying off. During the season, I made notes about additional work for the second year.

By late November and early December, deer had grazed my two smaller plots pretty hard, but they still had some daytime activity. I decided to see about expanding those smaller plots during winter. The Whitetail Forage Oats in the 1/2-acre plot were doing a bit better, so that one was fine. Some in-season scouting and camera work showed another stand location was needed at a promising spot, and one of my ladder stands needed a slight adjustment.

You don't have to accomplish everything the first year you own a property. It can be done in stages to keep it manageable. It's important to maintain food plots throughout the year with weed control, soil testing and rotating plantings, especially when having smaller plots. Having a prime food source all year is critical to success.

CONCLUSION

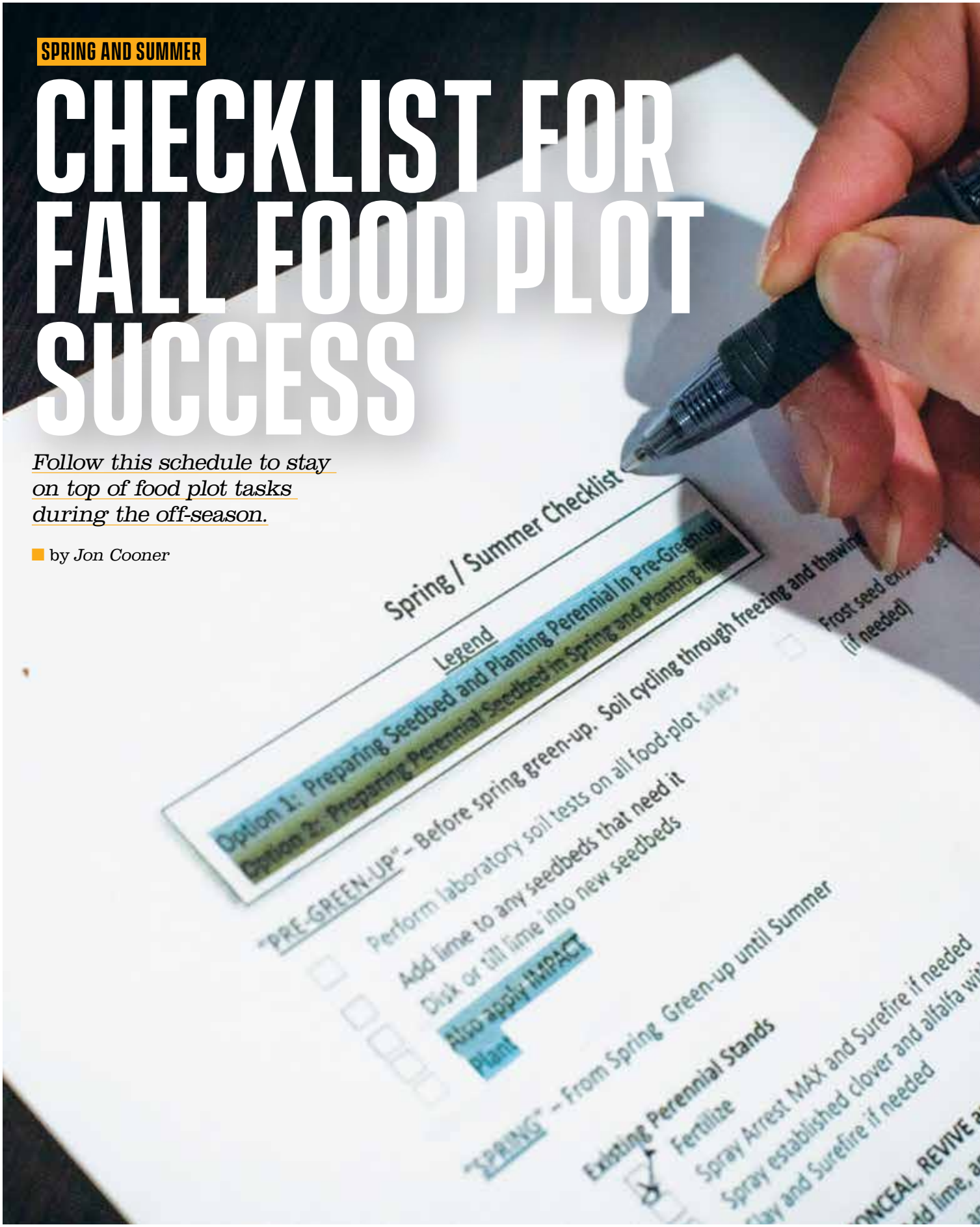
Owning hunting property is a great investment and, if maintained properly, provides years of enjoyment. You will also find a deeper connection with the land when you have a habitat and wildlife management plan, and you see the improvements for all wildlife. Plus, working the land becomes an extension of the hunting experience.

SPRING AND SUMMER

CHECKLIST FOR FALL FOOD PLOT SUCCESS

Follow this schedule to stay on top of food plot tasks during the off-season.

by *Jon Cooner*



■ The checklist might seem long and complex, but it really isn't. You already know much of the information and are simply mapping it out in a timeline.

With deer season months away and so many other activities vying for our time, it can be tempting to lose focus on how important spring and summer are to fall hunting success. With that in mind, here's a checklist of what you should be doing during spring and summer to make sure your food plots and deer are in top shape when hunting season arrives.

This might seem long and complex at first. It really isn't. You likely already know much of the information. I've just attempted to set it out as a timeline that looks a little complex. I hope it will also give you a way of understanding the entire process, not just a series of steps, so it becomes even simpler. I'll start each section with an overview of what you'll be doing at each stage.

THE PRE-GREEN-UP PERIOD

We'll define this as the period before spring green-up, when the soil is cycling through freezing and thawing. Pre-green-up begins at the start of the Whitetail Institute's published planting dates for perennials in your area. (You can find planting dates on product bags and at whitetailinstitute.com.) It ends when spring green-up begins in your area. Your main food-plot goals during this time are to start maintaining your existing perennial stands, begin converting fall annual stands to perennial stands and start preparing seeds for planting spring annuals.

You'll also have an important decision concerning new sites you plan to plant in perennials, because that will dictate what you'll need to do during spring and summer. You have two options: Prepare the seedbed and plant perennials in spring, or prepare the seedbed during spring and summer, and wait to plant until fall. A full discussion of how to make that decision is too long to undertake here, but important considerations include soil pH, weed and grass competition, and, to some extent, even soil quality. Most soils are acidic, with a pH of less than 6.5, and need lime to increase the pH to neutral (6.5 or higher). Option 2 gives you extra time to do a thorough job preparing the seedbed. Also, increasing soil pH with lime takes time. Adding lime a few months before planting provides more effective, longer lasting benefits to soil pH. The effect can be hastened to some degree by using Impact just before planting.

Another major consideration is the amount of weed and grass competition you can anticipate during spring and summer. In most cases, it will be vastly easier to control most grasses and weeds before planting a fallow site than after, which strongly supports waiting to plant perennials in fallow sites until fall. That allows you time to do a thorough job of controlling grass and weed competition during spring and summer before planting, including applying herbicides, repeated tilling or planting Revive in spring. Revive can help control weeds and boost soil quality, and can even make phosphorous and potassium more readily available to fall plantings.

All food plot sites: Perform laboratory soil tests on food plots and new food plot sites. When you receive soil test reports, add the lime recommended to existing and new sites. On new sites, thoroughly disk or till the lime in as soon as possible.

Existing perennial food plots (maintenance): Consider frost seeding additional perennial seed into existing stands if needed to help rejuvenate them after winter and get a jump on spring weeds. A great time to do this is when the soil is thawing during the day and re-freezing at night. The flexing of the soil can pull the seed into good contact.

New perennial food plot sites (Option 1, if planting during pre-green-up): The Whitetail Institute's published planting dates for perennials are well before spring green-up in most areas of North America. Soil pH starts increasing as soon as you incorporate lime into the seedbed. It takes time for it to fully increase soil pH. Consider also spraying Impact for a rapid boost in soil pH before planting if you'll be planting a perennial in spring.

SPRING

Spring begins at the natural green-up in your area and ends when soil temperatures reach a constant 65 degrees or higher. Your main food-plot goals for this period are to start perennial maintenance, which you'll continue into summer. That includes fertilizing and performing grass and weed control in existing perennial stands. This section has an option for preemptive weed-control during preparation of the seedbed for PowerPlant, Conceal, Revive and Sunn Hemp, but you won't actually plant those products until later.

You need to perform recommended maintenance steps on Whitetail Institute perennials starting in early spring if you expect to maximize their forage quality and lifespan. The steps are pretty simple. You might have already tackled two major steps during pre-green-up: having your soil tested, and adding required lime. But if you haven't, do it now. Also, be sure to perform the other steps: fertilizing, spraying for grass and mowing. These are specified in the maintenance instructions for each Whitetail Institute perennial, which you can find on the back of product bags and at whitetailinstitute.com.

Just as making sure soil pH is neutral for high-quality forage plants to uptake nutrients, you should also make sure nutrients in the soil are at optimum levels. The soil tests you performed during pre-green-up will tell you precisely whether the levels in your soil are optimum. If nutrient levels are low, the test reports will explain what fertilizer you should add. Following the report recommendations ensures you'll have done all you can to offer an optimum growing environment, and that you'll save money by avoiding purchasing unnecessary lime and fertilizer.

As the Whitetail Institute's first director of forage research, Wiley Johnson, often said, "In spring, grass control is your No. 1 priority in maintaining perennials. If you don't control grass in a timely manner, it can eat the stand up in a hurry." In most cases, grasses are best controlled in Whitetail Institute perennial stands by spraying Arrest Max. For optimum results add Sure-Fire Crop Oil Plus to the Arrest Max spray tank.

Existing perennial stands: Fertilize as recommended in your soil-test report. Some folks prefer to put out half the recommended fertilizer in spring and the other half in fall to help keep levels more constant.

Spray Arrest Max and Sure-Fire Crop Oil Plus if grasses appear. If necessary and appropriate — in established stands of clover and alfalfa only — also spray Slay and Sure-Fire to control broadleaf weeds. Do not spray Slay on newly planted plot until the plants are established. See the Slay label, or call (800) 688-3030 for information before spraying.

Mow existing perennial plots when you see anything in the plot (forage plants, grasses or weeds) start to flower or put on seed heads. Your goal is to remove the flowers or seed heads from weeds or grass, and remove most of the flowers from the forage plants. Usually mowing two or three times during spring and summer is sufficient. Don't mow perennials below 6 inches, and don't take off more than a couple of inches at a time. Also, don't mow when conditions are hot or droughty, and don't mow within one week before or after applying herbicides.

PowerPlant, Revive, Conceal and Sunn Hemp: The recommended planting dates for PowerPlant, Conceal, Revive and Sunn Hemp are later in spring than the planting dates for perennials. These should not be planted until soil temperatures have reached a constant 65 degrees, day and night, which is usually at least several weeks after spring green-up starts.

Spring / Summer Checklist

Legend
Option 1: Preparing Seedbed and Planting Perennial In Pre-Green-up
Option 2: Preparing Perennial Seedbed in Spring and Planting In Fall

"PRE-GREEN-UP"– Before spring green-up. Soil cycling through freezing and thawing

- ☐ Perform laboratory soil tests on all food-plot sites
- ☐ Add lime to any seedbeds that need it
- ☐ Disk or till lime into new seedbeds
- ☐ Also apply IMPACT
- ☐ Plant
- ☐ Frost seed existing perennials (if needed)

"SPRING" – From Spring Green-up until Summer

Existing Perennial Stands
- ☐ Fertilize
- ☐ Spray Arrest MAX and Surefire if needed
- ☐ Spray established clover and alfalfa with Slay and Surefire if needed
- ☐ Mow as needed

POWERPLANT, CONCEAL, REVIVE and Sunn Hemp
- ☐ (Optional) Add lime, and disk early, allow weeds to return, and spray glyphosate.
- ☐ Plant once soil temps reach 65 degrees or higher

"SUMMER (1st Half)"

Existing Perennial Stands
- ☐ Continue weed control efforts as needed

New Perennial Seedbeds (Optional)
- ☐ Disk or till at 2 week intervals

POWERPLANT, CONCEAL, REVIVE and Sunn Hemp
- ☐ Apply IMPACT to growing PowerPlant, Conceal, Revive and Sunn Hemp if needed to boost soil Ph
- ☐ REVIVE - Till standing; REVIVE back into soil when blooms first appear (4-8 weeks after planting)

"SUMMER (2nd Half) to Fall"

Existing Perennial Stands
- ☐ Continue weed control efforts as needed

New Fall Seedbeds (Optional)
- ☐ Stop disking about a month before planting date, allow weeds to return, and spray with glyphosate

- ☐ Plant fall plots during fall planting dates
- ☐ **High-N Fertilizer.** If called for In product instructions, fertilize again 30-45 days after germination with high-N fertilizer.

Like other summer activities, taking care of food plots should be a pleasure. Staying organized just helps smooth the process.

That gives you an option to be proactive in minimizing weed and grass competition.

Consider doing seedbed prep a bit early — a few weeks before you intend to plant — let weeds and grasses return (with spring green-up) and then spray them with a Roundup-type glyphosate herbicide. Then, plant when the soil temperatures are sufficiently warm.

Be sure to spray Arrest Max and SureFire to control grasses that appear in PowerPlant soon after planting. (Do not spray Conceal or Revive or with a herbicide.) Apply Impact before seeding if you need a rapid boost in soil pH.

SUMMER (FIRST HALF)

Existing perennial stands: Continue weed control efforts as needed.

Revive: This will start to bloom about four to eight weeks after you plant it. As soon as the first blooms appear, disk or till the standing Revive back into the soil. To help stop seed production and prevent new weed seed from germinating, it's crucial that you don't skip this step. After soil temperatures reach a constant 65 degrees, fertilize the seedbeds according to the soil tests, and plant PowerPlant, Conceal and Revive.

PowerPlant, Conceal, Revive and Sunn Hemp: Apply Impact if needed to give soil pH an additional boost.

Perennials planted in pre-green-up (Option 1): Reapply Impact to perennial stands to which you initially applied Impact when you planted during pre-green-up.

Seedbeds planted in a perennial in fall (Option 2): Consider continuing to disk the seedbed at strict two-week intervals during the first half of summer. This will bring up dormant weed seeds from the soil, where they will germinate and then be killed the next time you disk.

SUMMER (SECOND HALF) TO FALL

Let's define this period as being about one month before the fall perennial planting date.

Fallow sites: new perennial food plot sites (Option 2, if planting in fall): If necessary to control remaining grasses and weeds, stop disking or tilling about a month before your fall planting date. Then allow weeds and grasses to start growing again, and then spray them with a Roundup-type glyphosate herbicide before planting.

Plant: Plant fall food plot products according to the instructions on the bag. Plant during the planting dates recommended for your area.

High-N fertilizer (if appropriate): Fertilize non-nitrogen-fixing forages with additional high-nitrogen fertilizer, if specified, 30 to 45 days after germination.

One more thing: Don't forget to put out your Whitetail Institute 30-06 mineral/vitamin supplements. They're the icing on the cake for helping maximizing antler size, fawn size, doe lactation and overall herd health.

Like other spring and summer activities, taking care of food plots should be a pleasure, especially when you consider what you're giving back to the land, the quality time you get to spend with family, and the feeling of satisfaction you'll get in fall when the results come back to you in a big way.

GLYPHOSATE SHORTAGES

SUPPLY CHAIN DISRUPTION HITS FOOD PLOTS

You should tweak your entire weed management system to make up for the glyphosate void.

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


Mathews
MOULTRIE
Arrest
MAX

> "I ENCOURAGE EVERYBODY TO SHOP FOR GLYPHOSATE NOW. PROCRASTINATION MIGHT EQUATE TO WEED CONTROL PROBLEMS."

This is now personal. First, it was toilet paper and hand sanitizer. Later, components in automobile electronics became scarce. Supply chain disruption has now hit agriculture and, by extension, food plots. Glyphosate is in short supply, and prices have escalated. I have given up trying to comprehend the causes of supply chain disruption, and I won't even touch that aspect of the glyphosate shortage. I'm going straight to weed management alternatives without glyphosate.

Glyphosate has many use patterns in food plot management. Two of the most common and important are site preparation and pre-plant application to control emerged weeds on seedbeds before seeding forages. Glyphosate can also be applied with a specialized applicator called a weed wiper. Although that's a small niche use of glyphosate, it's a very useful tool to control tall weeds without damaging forages. Because glyphosate has many possible uses in food plot management, an entire weed management program needs to be considered when planning alternatives. A word of warning: There is not a one-for-one replacement herbicide that can be cleanly substituted for glyphosate. The entire weed management system needs to be tweaked to fill the glyphosate void.

REVISED MECHANICAL WEED CONTROL STRATEGIES

Pre-plant tillage using a disk harrow or power tiller can replace glyphosate for weed control on the seedbed before seeding forages. This is called stale seedbed weed control. Its objective is to create a weed-free seedbed before seeding forages, which gives crop seedlings a competitive jump on weeds. Multiple tillage operations might be needed to produce a weed-free seedbed. Repeated stale seedbed tillage is effective, but it adds to the overall cost of weed control compared to one application of glyphosate.

Mowing or clipping tall weeds is a partial replacement for glyphosate applied with a weed wiper. Repeated mowing suppresses erect annual and perennial weeds. Ideally, mowing should be done when weeds reach 12 to 18 inches high, which is normally well above the low-growing forages. During a three- to five-year period, repeated mowing during summer can deplete root reserves of perennial weeds. This practice will help suppress their growth and reproduction. Mowing is not as effective as glyphosate in managing perennial weeds. However, in the absence of glyphosate, mowing will keep populations of perennial weeds from increasing.

OTHER HERBICIDES

Glyphosate is broad spectrum and systemic. It controls grasses and broadleaf weeds, annuals and perennials. However, there might be situations during site preparation when grasses are not present and broadleaf weeds need to be controlled. For site-preparation broadleaf weed control, 2,4-D and/or triclopyr are substitutes for glyphosate. Grasses will not be controlled by 2,4-D or triclopyr, but those alternative herbicides are effective at controlling broadleaf weeds. Additionally, triclopyr is useful in controlling woody broadleaf weeds and brambles. These herbicides will kill food plot forages if directly applied. However, 2,4-D and triclopyr have minimal soil herbicidal properties and are ideal for site preparation.

Glufosinate is a nonselective herbicide that has similar use patterns as glyphosate. Despite name similarity, glyphosate and glufosinate are chemically very different. In general, glufosinate is not as effective on perennial weeds as glyphosate. Informal discussions suggest that glufosinate might also be in short supply. Glufosinate has not been marketed or packaged for small or intermediate uses, but that might change. Glufosinate has been more costly than glyphosate, and that trend will likely continue.

Pelargonic acid is a fatty acid, somewhat like a soap. It's a quick-acting nonselective contact herbicide that controls annual broadleaf weeds. Pelargonic acid does not move in the vascular system of treated plants and will not control perennial weeds. In the recent past, many glyphosate-containing herbicide products sold in chain stores were blended with pelargonic acid to quicken weed control response. I have many years of research experience with pelargonic acid. Although the herbicide can effectively control annual weeds on seedbeds, it's tricky to use and achieve acceptable performance. Pelargonic acid is a specialized herbicide that has not been widely used in conventional agriculture, making it a costly alternative to glyphosate.

Some herbicides derived from plant-based products might be promoted as alternatives to glyphosate. These are niche herbicides used in organic crop production. All are nonselective and quick acting but not systemic. Natural product herbicides will not control perennial weeds, and I never controlled grasses with these products. Product names are numerous, almost impossible to track and change rapidly as rebranded products are introduced. Active ingredients are from plant-based sources, such as concentrated vinegar (greater than 20 percent acetic acid), citrus oil (d-limonene), lemongrass oil, clove oil, cinnamon oil and others. Based on many years of research experience with these herbicides, I've found the performance of natural product herbicides to be unpredictable, and I'm being kind with that assessment. Further, these herbicides are very expensive. Therefore, Whitetail Institute does not recommend natural product herbicides for weed control in food plots.

STRETCHING GLYPHOSATE SUPPLY

Folks who already have glyphosate can extend their supply by carefully matching the rate with weeds present. Common use rates of glyphosate range from 0.5 to 2.0 percent. Small annual

weeds can be effectively controlled with glyphosate mixed to make a 0.5 percent solution. The highest rate (2 percent) should be reserved for controlling woody weeds or any perennial species. For site preparation when grasses and broadleaf weeds are present, adding 2,4-D and/or triclopyr with a low rate of glyphosate will provide acceptable overall weed control.

DON'T FORGET ABOUT ROUNDUP

When this issue began to develop in Fall 2021, I contacted a friend with Bayer, the current owners of name-brand Roundup. Roundup products are formulated in the United States. Generic glyphosate herbicides are formulated overseas. However, the supply of Roundup remains linked to the availability of the active ingredient and inert carriers, which are manufactured overseas. Despite the vulnerability, Roundup might be available from time to time in the coming months. Roundup is more costly than generic glyphosate, but do not become fixated on the price difference. All glyphosate herbicides are going to be pricey in 2022.

DON'T WAIT

I encourage everybody to shop for glyphosate now. Procrastination might equate to weed control problems. I suspect that many food plotters purchase herbicides from common retail outlets. If those outlets do not have glyphosate, divert your shopping efforts to traditional agricultural suppliers. They will have glyphosate at times, and perhaps you can purchase or at least reserve glyphosate for a future purchase. Be prepared to buy glyphosate in case lots (two 2 ½-gallon containers per case), not by the gallon. Traditional agricultural suppliers sell products packaged for large-scale use, not homeowner or intermediate use. Additionally, understand that traditional agricultural suppliers might first serve farmers and their large-volume customers.

While preparing this article, I was surprised to discover that many herbicides can be purchased on Amazon. A search in February indicated generic glyphosate was available on Amazon, along with glufosinate. Triclopyr, an excellent herbicide for site-preparation weed control, can be purchased on Amazon. Other reputable Internet vendors might also have glyphosate.

In 2013, there was a shortage of .22 LR ammunition. At 6:30 a.m. every weekday, many customers clustered around a local department store's sporting goods section waiting for ammunition to be restocked. They cackled with glee when the heavily laden cart carrying ammunition came clanking down the aisle. That folly was repeated daily for months. The reasons for disruption in .22 LR supply were vague, but there was hoarding, which contributed to the chaos. My brother and I jokingly concluded that .22 LR ammunition had become a form of currency. In 2022, glyphosate is now a form of currency. Anybody want to swap .22 LR ammo for a quart of Roundup?

WHITETAIL INSTITUTE IMPACT:

A TRUE LIME ALTERNATIVE

Food plotters now have a great alternative to boost soil pH at remote locations or before the fall growing season.

by *Jon Cooner*

INSET PHOTO BY W. CARROLL JOHNSON III, PH.D.

IMPERIAL WHITETAIL

IMPACT SOIL AMENDMENT

■ Create high-yielding, nutritious food plots in areas anywhere bulk or pellet lime is not an option. Depending on soil type and rainfall amounts, Impact can improve forage quality and growth for three to five months with one application. Great for annual plantings. Perennial plots could need two or three applications.

Soil pH is the most important factor you can control to ensure food plot success. Whitetail Institute Impact is a new tool for food plotters that increases soil pH without lime. It's ideal for remote plot locations where liming isn't an option, and to provide an immediate short-term boost to soil pH for optimum food plot growth.

Soil pH is the most important part of seedbed preparation. In fact, making sure that soil pH is optimum before you plant can make the difference between the best food plot and failure. Soil pH is a direct measurement of how well — or poorly — your forage crop can uptake nutrients from the soil. Unless soil pH is optimum (6.5 or higher for most high-quality food plot plants), nutrients are bound up in the soil, and plants cannot access them.

The best course to correct the pH of acidic soil is to incorporate lime into the seedbed well before planting. In some cases, though, it's not possible to add lime to a remote seedbed or access a plot with tillage equipment. In such cases, Impact can be a life saver. It's also perfect for providing a rapid increase in soil pH, even in plots that have been recently limed. Impact bridges the gap while slower activating ag lime starts to work.

Several other products claim to increase soil pH. Unfortunately, some do not live up to their marketing hype. How do you know that Impact actually increases soil pH? By its stated CCE, which you'll find on the label.

Guaranteed Analysis

Total Nitrogen (N)	8%
Soluble Potash (K20)	40%
Calcium Carbonate Equivalent	68%
Proprietary & Inert Ingredients	52%
Percent of solids passing through a 325 Mesh screen in liquid form	100%

Can be applied directly to the soil or as a foliar spray 100% absorption and availability

Very low salt index: 10

IMPACT INCREASES SOIL PH

Before buying, look for a calcium carbonate equivalent, or CCE. The preferred way to increase the soil pH of a seedbed is to incorporate lime by disking or tilling. Lime is all or mostly calcium carbonate. Keep in mind what's important about that: carbonate. The carbonate part of calcium carbonate actually increases soil pH, not the calcium. Calcium just acts as a sort of carrier for the carbonate.

You don't have to be a chemistry expert to understand what that means. It's easy, and understanding it also ensures you don't get duped into buying a product that claims to increase soil pH when it doesn't.

Calcium carbonate increases soil pH. Calcium chloride does not. Let's say you're considering using something other than lime to increase soil pH. How can you know how well — or poorly — it will work? Just compare it to a known standard — in this case, how well lime (calcium carbonate) would do the job. That comparison is stated as a product's CCE. For example, something that increases soil pH as well as lime would have a CCE of 100 percent. A product that's only half as effective as lime for increasing soil pH has a CCE of 50 percent.

Compare that to recently introduced calcium chloride products that are advertised as lime substitutes. Calcium chloride has a CCE of 0. They don't increase soil pH. Before you buy a non-lime product advertised as increasing soil pH, make sure what it is (and is not).

If a product actually increases soil pH, it should have a CCE stated in its documentation or packaging. If it doesn't, that should be a red flag. Search for the product you're considering and its SDS. That will reveal the product's safety data sheet and tell you what the substance is. Don't be fooled by suggestions that calcium chloride increases soil pH. It doesn't. Period.

Like carbonates, oxides also increase soil pH. Impact is an oxide that has as CCE of 68 percent, meaning it has 68 percent of the soil neutralizing ability of limestone. As such, it's not a full substitute for incorporating lime into an acidic seedbed. However, it will help increase soil pH if liming isn't an option. Unlike lime, Impact increases soil pH almost immediately, and it even has a starter fertilizer that contains nitrogen and potassium, and makes them immediately available to plants.

IMPACT (25 LBS./A)

NONTREATED (NO LIMING MATERIAL)

– IMPACT FOR NO-PLOW

This is a field demonstration in Upson County, Georgia, on Davidson clay loam soil. Impact was sprayed and No-Plow seeded Sept. 22, 2020. The pH of the nontreated plot was 5.5. The pH of the Impact plot was 5.8, plus a significant increase in soil potassium. This picture was taken on Nov. 8, 2020. Notice the differences in foliage density and the overall vigor of No-Plow from Impact applied immediately before planting.

IMPACT (12.5 LBS./A)

NONTREATED (NO LIMING MATERIAL)

– IMPACT FOR WHITETAIL OATS PLUS

This trial location was in southern Georgia, on Tifton loamy sand soil. The pictures were taken March 4, 2020, about four-and-a-half months after treatment and seeding with Oats Plus. Notice the improved crop vigor and overall growth after the Impact treatment compared to the nontreated plot.

How can Impact benefit your food plot efforts? Lime is the best substance for most people to use in increasing soil pH, but there will always be situations in which liming an acidic seedbed isn't an option. One reason is the large amounts of lime that are usually needed to increase soil pH — often tons per acre, which can be difficult to transport to remote sites. Also, lime should be disked or tilled into the soil for optimum results, you can't access some sites with heavy equipment. Impact is a great second-best option for folks who can't get lime or equipment to a remote plot. It's sprayable and can be easily transported to remote sites on an ATV or UTV.

Impact can also be a cost-effective option for people who only want to increase soil pH for the start of the fall growing season — for example, if they only have a one-year lease. In such cases, Impact can provide a short-term boost in soil pH for planting annuals for one year.

Impact also increases soil pH almost immediately — much more quickly than lime — which might make it an even better option than lime for neutralizing soil at a last-minute plot or to bridge the gap with a rapid soil pH boost after liming until the lime catches up.

	pH	P	K	Ca	Mg
Impact (25 lbs./A)	5.8	109	510	1504	309
Pelleted dolomitic lime (1000 lbs./A)	5.7	37	312	1480	339
Nontreated	5.5	72	365	1531	281

Here are the results of a Whitetail Institute test performed on No-Plow in Georgia. Laboratory soil testing before planting showed that the fallow site, an old logging road, had highly acidic soil. One side was treated with Impact before planting, and the other side was limed at a rate of 1,000 pounds per acre. Both sides were equally fertilized with 10-10-10 and planted. Soil tests were performed again three weeks after planting.

Whitetail Institute has always recommended the use of mined, crushed limestone rock in ag lime or pelleted lime form for increasing soil pH in acidic seedbeds, and that hasn't changed. If you can't get lime or heavy equipment to the site, though, or want to give soil pH a quick boost, Impact is designed to do the job. It should be sprayed immediately before or after planting and, if needed, can be applied twice, a month apart. Impact reacts immediately after the first rainfall, and its effects last three to five months per application.

For information, visit whitetailinstitute.com, or call (800) 688-3030.

PLOT PERFECTION

THE FIRST FULL-FUNCTION APP DESIGNED FOR FOOD PLOTTERS

This new tool provides game-changing functionality for land managers.

by *Jon Cooner*

At last there's a full-function app designed for food plotters. Whitetail Institute's new PlotPerfection app lets you keep all your historical and planning information in one place at your fingertips. PlotPerfection works with iPhone or Android. Go to plotperfection.com to view a great explanatory video and to download the app.

PlotPerfection is new industry-standard technology. A full-spectrum food plot app has been long overdue. Previously, the only way to accomplish what PlotPerfection does was to use several unrelated apps — not designed for food plotters — for various food plot functions, which required you to switch back and forth to accomplish your goal. For example, you'd need one app for aerials and another for plotting. You also needed a place to store documents such as soil test reports, photos and notes, and a separate app to perform fertilizer calculations. PlotPerfection integrates all that information into one highly useful app.

NUTS AND BOLTS

PlotPerfection lets you maintain records and planning for anything from one to several food plots, and even multiple properties. To get an idea of how great a tool the app is, watch the brief introduction at plotperfection.com, which explains its highlights. After you download PlotPerfection, it works like any other app you'd get from the Apple or GooglePlay store.

Dashboard: When you open the app, you'll see the first indicator of how comprehensively useful it is: the side menu. The first side link is the dashboard option, which gives you a list of your plots with links below each plot that provide the plot's details, including historical information and things you plan to do. In addition to the side menu, many of the app's options are directly accessible from dropdown menus that appear when you click on other categories in the sidebar, providing easy access to information no matter where you are in the app.

■ PlotPerfection is a one-stop shop for everything a food plotter needs to track with their plots. Best, it's easy to use.

PHOTO BY JASON SAY

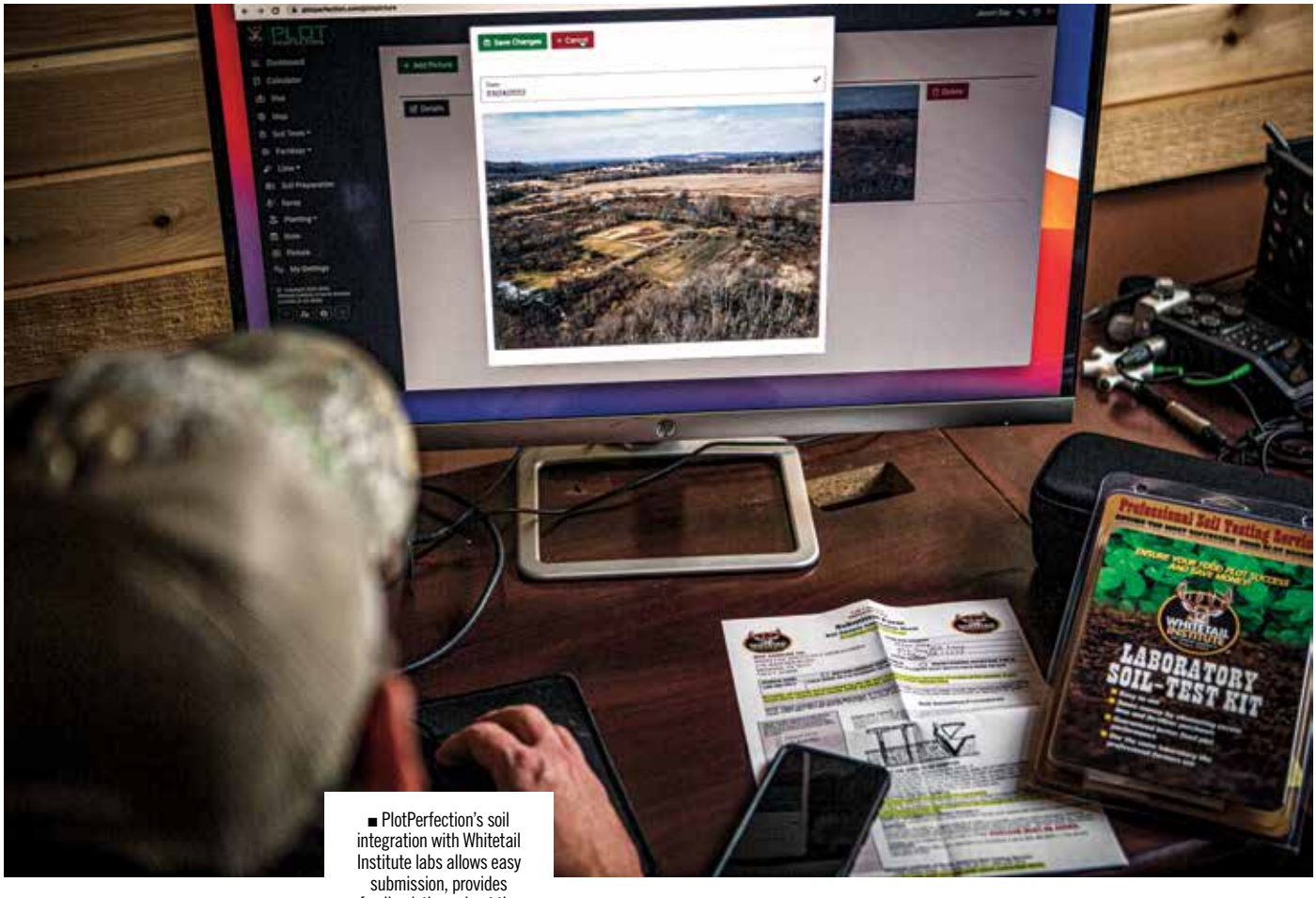


PHOTO BY JASON SAY

■ PlotPerfection's soil integration with Whitetail Institute labs allows easy submission, provides feedback throughout the process and pulls the results back into the app.

Map integration: The mapping option in PlotPerfection lets you quickly and easily draw the boundaries of each of your plots on an aerial photo integrated into the app. After you draw a plot's boundaries, the app automatically calculates the acreage of each plot, another function that previously took multiple apps to accomplish. You can click on each plot and immediately access the historical information you've entered, plus your planning information.

Integration with Whitetail Institute soil testing laboratory: Perhaps the most useful aspect of PlotPerfection is its integration with Whitetail Institute's soil testing lab. Performing laboratory soil tests any time you're considering buying lime or fertilizer is the most important tool for ensuring success and saving money. PlotPerfection is directly interfaced with the Whitetail Institute lab to make submission of soil samples and receipt of soil reports even easier.

Soil testing information: PlotPerfection eliminates the need to hand-write a sheet of paper to send in with soil. Instead, fill out the form in the app, print it out and send it with the soil sample. You'll be notified immediately when the lab receives your sample and again when the report is ready. And here's the kicker: The lab doesn't just send you the report. It has an internal ID for each test that directly connects the lab with PlotPerfection, and it lets lab results automatically flow back to the app.

Lime and fertilizer calculator: When your soil report information has been sent to your app, it's stored there so you can track trends through time. If you have multiple plots, the app will tell you totals needed for lime and fertilizer. And one of the most useful features is the app's ability to let you input fertilizer elements or blends in your area and tell you how to combine them to the lab's recommendations.

Journal: As you add historical and current information about your food plots, you'll essentially be creating a journal — a record of historical information you can use to identify trends. That can be incredibly useful in keeping track

PLOTPERFECTION App Offers Food Plotters Many Benefits

- Keep track of everything to make your food plots the best they can be, including soil testing, fertilizer, lime, soil preparation and spraying.
- Soil test results are delivered directly into the app from the lab.
- Planning modules let you get everything in order during the off-season, so you're ready to go when planting time comes.
- The fertilizer calculator lets you accurately figure correct amounts for plots.
- The seed calculator helps you decide how much seed to apply on a plot.
- Integration with Whitetail Institutes seed mixtures make sure your rates are up to date and accurate.
- Map integration lets you draw out your plots and calculate your acreage and seed needs.
- Notes help you keep track of plot inputs and activities.
- Pictures let you see how your plots are performing.
- Multiple properties let you keep things separate but in one place.

> “PLOT PERFECTION IS A GO-ANYWHERE, ONE-STOP SHOP FOR FOOD PLOTTERS.”

of various subjects, such as soil nutrient usage, to help you gauge how much fertilizer you need to buy. It can also help you monitor how bucks using a plot are improving, and answer any questions about the effects of your efforts at a food plot and the wildlife it supports.

Planning component: PlotPerfection will calculate how much seed you need to buy. Input the name(s) of the Whitetail Institute product(s) you plan to plant in each plot, and the app will provide precise recommendations of the total seed you'll need. If you plant perennials, the app will also help you keep track of maintenance tasks, such as spraying for grass and weeds. And no more struggling to remember the details of what and how you sprayed in the past. The app's recording component lets you immediately determine what you've sprayed before — not only how much herbicide, but even how much water you used in the solution and how fast you drove. You can use that information in your current planning.

Photos: PlotPerfection lets you import photos so you organize and track them by food plot. They're tied to a timeline so you can look back and see the results of your work.

Catch-all: With any information you record in PlotPerfection, you can also add comments and notes. This can be extremely useful for accuracy instead of relying on memory about things such as the timing of planting and spraying, which forages worked better than others, and if you planted something other than what was listed on the soil test.

CLOSING THOUGHTS

PlotPerfection is a go-anywhere, one-stop shop for food plotters. You can have all the information you need, and it's immediately accessible for preparing, planning and reviewing food plot matters from your living room and at your property. Whitetail Institute will continue to upgrade the app to provide additional capabilities, such as a calendar for planning tasks such as planting, maintenance and when to start preparing seedbeds.

To start, go to plotperfection.com, and sign up. You'll get a “getting started” screen that will help you set up. Also, instead of text-based help files, you'll get videos linked to specific features and overall to help use PlotPerfection. The videos cover everything, but the library will undoubtedly grow as the app continues to evolve.

Introductory offer: As a limited-time introductory offer, you can get PlotPerfection for $29.99 and get two free soil tests when you sign up. The app is an exceptional value if you're a serious food plotter.

THE GHOST BUCK

RYAN BUNCE | NEW YORK

Since I can remember, deer hunting has been my passion, and since I could hunt, I've looked for ways to further my success.

In 2009, at 16, I took my first buck with my bow, over a Whitetail Institute Imperial Clover plot. From there, my passion has only grown.

Through the years since, life, work and other events have impeded my time to prepare fully for deer season. That changed in 2020, when I found a way to balance work and play. I made food plots a priority for the first time since I started hunting, and devoted as much time as possible to learning everything I could about when, how and where to plant food plots. I viewed several Whitetail Institute instructional videos and took a soil sample to see the effects of adding lime and fertilizer. That was the right decision.

After liming, I prepared the soil, planted and fertilized Imperial Whitetail Institute Clover in spring, and used the same process when planting Winter Greens, Pure Attraction and No Plow about Aug. 1. I invested in a small sprayer and used it to spray Whitetail Institute's Slay and Arrest Max after the plants were well established. After that, I set trail cameras and let nature take its course. I applied as little pressure to my food plots as possible and created access points that would let me enter and exit without spooking deer. The stage was set.

At the end of the 2017, 2018 and 2019 deer seasons, I had one deer in mind and hoped he made it through to the next season. Although a cliché, I believed this legend was true to his name: "Ghost Buck." My efforts with the food plots were aimed mainly at shifting the Ghost Buck's core area closer to where I hunt.

I had two trail camera pictures of the Ghost: one from 2017 and another from 2018. So I did not have much information to work with. The Ghost showed up in the middle of the night and did not show himself after his appearances in mid-November. In 2019, I heard about a buck that made several appearances about a half-mile south of where I hunt. I had a hunch this mystery buck might be the Ghost, and I placed trail cameras at scrapes on the far southern end of my hunting property. In mid-November, the Ghost appeared a handful of times at those scrapes. I hunted hard to no avail, with no sightings or daylight appearances.

As during previous years, I didn't know whether the Ghost made it through hunting season. Nonetheless, my motivation to end the chase in 2020 was higher than ever before. Whitetail Institute food plots would be my main component for achieving that goal.

July, August and September passed with no sightings of the Ghost. Several tempting bucks appeared on my food plots, but I was determined to locate the Ghost. On Oct. 22, the Ghost made his first 2020 appearance, at a scrape on the southern end of the property. The buck had added several character points, and my excitement was through the roof. I knew a deer like that might only come once in a lifetime, especially in the heavily pressured area of upstate New York where I live. After the buck's first appearance, every camera card pull was filled with anticipation.

On Nov. 3, my hopes were realized. The Ghost Buck followed a doe into my Imperial Clover plot. After Nov. 3, the buck became a regular at my food plots and showed up almost nightly. I had achieved my goal, and it was only a matter of time before the Ghost made a mistake.

On Nov. 22, 2020, the second day of New York's Southern Zone gun season, it was cold and crisp. I climbed into my stand on the southern end of the property, hoping to see the Ghost coming back to bed after a night of feeding on my food plots to the north. After two young bucks strolled through at 8 a.m., the woods became still. Just before 9 a.m., two does trotted up the trail, and I couldn't believe what followed. The Ghost was right there.

In a rush of excitement, I leveled my gun and hurried the shot, and it was off the mark. The Ghost took three steps after the shot and stopped. As if he knew his time was brief, the Ghost lifted his head and peered up the ridge. I steadied my gun, took my time and put an end to the chase. Although the story of the Ghost was finished, I will never forget the anticipation and excitement he brought to my hunting seasons from 2017 through 2020. The legend of the Ghost will be a story that I tell until I die. One of my favorite aspects of the hunt was that I got to experience it with my father.

I can't thank Whitetail Institute enough for the tips that led to my success and brought the Ghost close.

ANGIE LARSON | GEORGIA

For some women, hearing that you need a mastectomy to remove cancer in your breast is devastating. I heard "surgery" and knew hunting season was fast approaching, and I was going to miss out.

Cancer? I never questioned whether I would kick it to the curb. I was worried about not being able to hunt Bobtail, a double drop-tine buck, or Scar, a 7.5-year-old deer. Bobtail had been showing up on our 56 acres and the 160 acres our neighbor lets us manage for about two years. In 2020, velvet pictures proved he had grown into a double drop-tine with good mass.

The Whitetail Institute 30-06 mineral lick has to be the best thing since sliced bread. Bucks, does and fawns benefit from this red dust, and they love it. This is the only mineral lick we use, and we swear by it. My husband, Dave, and I have turned our 56 acres into quality deer habitat through blood, sweat and cusswords. We have managed to keep a great buck-to-doe ratio despite having hunting clubs across the street that want in on the action.

On Sept. 9, 2020, I was diagnosed with DCIS breast cancer. Doctors scheduled a mastectomy for Oct. 19, three days after the opening of gun season in Georgia. I got to hunt Saturday and Sunday but then said goodbye to my Savage .270 for the season — or so I thought. The surgery went well, and all the cancer was removed. Dave was the best caregiver a girl could hope for. Knowing I had a few months of recovery before my second reconstructive surgery, I healed at home the best way I knew how — sitting in my living room in a comfy chair with my cat, my blanket and binoculars. Every chance I got, I curled up watching across the field where we had a mineral lick. The rut was on, and I saw lots of action from my cozy setup.

Dave caught glimpses of Bobtail here and there, and Scar was nocturnal, so Dave's season was stressful. During one of my visits to my doctor in late December, I asked when could I shoot my rifle again. I shoot right-handed, and the surgery had been on my left side, so the doctor said the golden words: "I think you'll be OK. It might hurt, but you should be healed enough." I couldn't keep my grin hidden, even under my COVID mask. I was going hunting.

The previous year, Dave and I had built a platform near our house for hunting hogs. It's low to the ground and easy to access, so with two weeks left in the season, Dave went to his neck of the woods, and I padded my bra with socks and went to mine. Like a scene from a hunting show, with 30 minutes of light remaining on the next-to-last weekend to hunt, Bobtail walked out of the woods on a string, straight at me. I grunted and dropped him.

Cancer sucks, but hunting cures what ails you. 30-06 Mineral/Vitamin Supplement is an amazing product. It helps provide the best quality nutrition to deer, and they love it. Even the does have bigger bodies, and the bucks are bigger and better each year.

RYAN D. BUSKEY | NEW YORK

When we purchased our property in 2012, deer sightings were minimal. In 2013, we started planting food plots using seeds from Whitetail Institute. Each year, we have made our seven plots larger and more diverse, with improved soil quality. Each year, the animal sightings increase — not just deer but all animals native to our area. We have taken some nice bucks for our highly pressured section of New York.

BILL KNIGHT | IOWA

■ I've used various Whitetail Institute products for many years and have always been amazed at their quality. Imperial Whitetail Clover is my favorite. I have tried other brands but have always come back to the Whitetail Institute because of its outstanding quality. I have tried generic clover seed and other brand-name products and was disappointed when comparing them to Imperial Whitetail Clover. Deer and other wildlife use the other stuff, but when I planted Imperial Whitetail Clover, the difference was amazing. I have many more deer and turkeys using Imperial Whitetail Clover at any time of day and during every season. It's remarkable.

My family and I have had the privilege to take numerous big, healthy whitetails from our property, and I give much of the credit to the Whitetail Institute. I recommend the Whitetail Institute seed and products to anyone who wants to improve the quality and health of wildlife in their area. These products have helped me become a much better wildlife manager. I realize genetics controls much of the quality of wildlife. However, without the proper nutrition, animals can never reach their genetic potential. The superior nutrition and attractiveness of the Whitetail Institute products lets this occur.

The wildlife in my area are much better suited to withstand the harsh conditions Mother Nature often produces. Whether it's heavy snow or a heated drought, I don't have worry, as long as I have a few Whitetail Institute food plots. I've included a few photographs as evidence. Instead of telling hunting stories, I wanted to thank Whitetail Institute for all of its outstanding products, not to mention its awesome customer service. You have helped make great memories for me and my family.

BRAD CUNNINGHAM | VIRGINIA

■ I've been planting Whitetail Institute products for close to 20 years. Imperial Whitetail Clover has always been a successful base planting, and deer love it, especially in small, secluded areas less than 1 acre.

I have a 250-acre lease in southwestern Virginia, and about 12 acres of that is tillable ground. In fall, I've also had great success with Imperial Winter Greens and Pure Attraction. When planting these annuals, I look for rain toward the end of September and plant right before significant precipitation. Plants are up and growing within seven days. I've tried local ag seeds and products from other companies, but none have equaled the plant growth or attraction produced by those three products, along with the 30-06 mineral supplements in spring and summer. We've taken bigger bucks, and the minerals are great for attracting deer to trail cams in summer so you can see what deer you have on your property.

I would recommend Whitetail Institute for anyone looking to provide nutrition for the animals on your property — not to mention increased deer sightings.

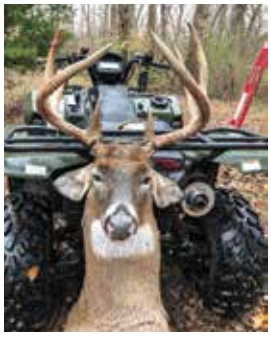
ERIC ERNST | OHIO

■ I have sent in several stories through the years. Long story short, we've found success year after year. The herd is healthier, and bucks are getting bigger quicker. Our 3.5-year-old bucks are bigger than the 4.5-year-olds were four years ago.

TIMOTHY DEHAAN | INDIANA

■ After eight years of thinking my little hunting property would produce bigger deer, I finally planted food plots in 2020. I planted maybe 3 to 4 acres, and our trail cams showed at least four shootable bucks with 8-plus points.

I shot the biggest deer of my life, and so did my buddy. I had countless deer all over me. I plan on planting the same — plus more — acreage in the future.



TIMOTHY WILLIAMS | LOUISIANA

■ More than seven years ago, we began planting 5 acres of Whitetail Imperial Clover and Oats Plus, along with a couple of acres of Tall Tine Tubers and Ravish Radishes. Since then, we've seen steady increases in the average body size of does and bucks on our property. But more impressive is the increase in rack size. Before using Whitetail Institute products, our biggest bucks were around 150 inches. During the 2021 season, we had several bucks that were 170 to 180 inches.

I've bowhunted this area of southern Missouri for more than 35 years and have never seen racks that big. The major contributor to our success, I believe, has been the increased nutrition our land has provided with Whitetail Institute products. We now consistently attract deer, grow deer and harvest deer that didn't exist just a few years ago.

WILLIAM HOWITT | MICHIGAN

■ When I first started managing my property, I did what I could with hand tools, a rented roto-tiller and some No-Plow, but we immediately began seeing and holding more deer. Still, we were shooting what was common for the area: spikes, forkhorns and an occasional basket rack. As I was able to afford and acquire better equipment, and through trial and error — much error if you don't follow directions and try to take shortcuts — I started sweetening up the soil and expanding my food plots with mineral licks. We then began to see a noticeable difference in deer quantity, along with larger racks. Enter some additional management practices of cull bucks and increased doe harvest, and letting all bucks with potential age, and the taxidermy bills are killing me, and my children are now buck snobs.

ANTHONY MILLER | MISSOURI

■ I started using Whitetail Institute products about 20 years ago. I bought some clover for a friend's farm. Now I have my own farm and still use Whitetail Institute products. My property is in west-central Illinois, where there is a lot of agriculture. What I have found out through the years is that when things green up in spring, deer have more than enough food. I cannot compete with the local farmers and the amount of food they supply the deer herd. What I can do is give them a green afternoon food source they can visit every day. More important, I can provide them with a green food source when they need it most: October through February. That's why I plant Whitetail Oats Plus and Beets and Greens. I have two food plots about 1/2 to 3/4 acre each, and I plant them the same. I just rotate the oats and brassicas, half on one side and half on the other. And then the next year, I rotate. The reason I rely on Whitetail Institute products is they are made for deer, and because of the research. Also, I like their palatability, drought resistance, resistance to grazing pressure and quick establishment. Thank you for making a great product.

TOM WARD | MASSACHUSETTS

■ I've been working on what is best to plant for my particular situation. I've had had two good seasons with Whitetail Oats. During 2020, I had a tough growing season, because of extreme drought. But some oats grew and still attracted deer — including this 13-point buck, which I shot during archery season in a Whitetail Oats plus food plot.

FOOD PLOT PLANTING DATES...

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

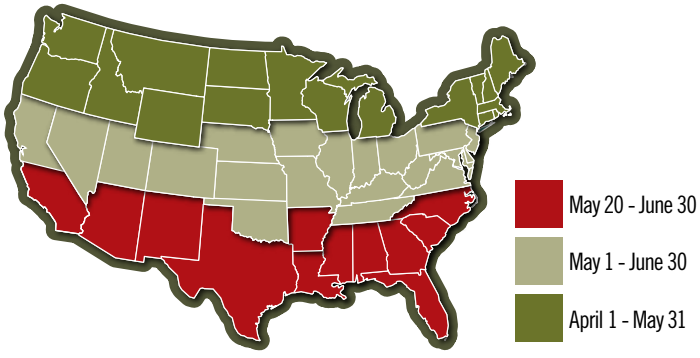
1. **Call for planting dates**
2. Apr 1 - July 1
3. Apr 15 - June 15
   Aug 1 - Sept 1
4. **Coastal:** Feb 1 - Mar 15
   Sept 1 - Oct 15
   Southern Piedmont:
   Feb 15 - Apr 1
   Aug 15 - Oct 1
   Mountain Valleys:
   Mar 1 - Apr 15
   Aug 1 - Sept 15
5. Feb 1 - Apr 1
   Aug 1 - Sept 30
6. Feb 1 - Apr 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 $29.97

IMPERIAL WHITETAIL **CLOVER**

36 LBS.-4.5-ACRE PLANTING

$249.99 + tax
Suggested Retail $279.96
___ (36 lb.) quantities of Imperial Whitetail Clover
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $42.98

IMPERIAL WHITETAIL **EXTREME**

46 LBS.-2-ACRE PLANTING

$246.98 + tax
Suggested Retail $289.96
___ (46 lb.) quantities of Imperial Whitetail EXTREME
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $20.01

IMPERIAL WHITETAIL **CONCEAL**

SOLD OUT!
Call 1-800-688-3030 opt1 to pre-book for 2023

Suggested Retail $139.99
___ (28 lb.) quantities of Imperial Whitetail Conceal
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $42.97

IMPERIAL WHITETAIL **FUSION**

27.75 LBS.-4.5-ACRES PLANTING

$246.99 + tax
Suggested Retail $289.96
___ (27.75 lb.) quantities of Imperial Whitetail Fusion
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $5.02

IMPERIAL WHITETAIL **POWERPLANT**

SOLD OUT!
Call 1-800-688-3030 opt1 to pre-book for 2023

Suggested Retail $120.00
___ (50 lb.) quantities of Imperial Whitetail PowerPlant
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $29.98

IMPERIAL WHITETAIL **PURE ATTRACTION**

26 LBS.-.5-ACRE PLANTING

$59.99 + tax
Suggested Retail $89.97
___ (26 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 $20.00

IMPERIAL WHITETAIL **OATS PLUS**

45 LBS.-1/2-ACRE PLANTING

$59.98 + 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 $19.98

IMPERIAL WHITETAIL **NO-PLOW**

36 LBS.-2-ACRE PLANTING

$134.98 + tax
Suggested Retail $154.96
___ (36 lb.) quantities of Imperial Whitetail No-Plow
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $19.98

IMPERIAL WHITETAIL
WINTER PEAS PLUS

44 LBS.-1-ACRE PLANTING

$129.98 *+ tax*
Suggested Retail $149.96
___ (44 lb.) quantities of Imperial Whitetail Winter-Peas Plus
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $16.00

IMPERIAL WHITETAIL
KRAZE

$42.98 *(4) pak*
Suggested Retail $52.99
$59.99 *(6) pak*
Suggested Retail $75.99
+ tax
___ (4) 5lb bags @ $42.98
___ (6) 5lb bags @ $59.99
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 $11.00

IMPERIAL WHITETAIL
APPLE OBSESSION

$44.99 *(4) pak*
Suggested Retail $52.99
$64.99 *(6) pak*
Suggested Retail $75.99
+ tax
___ (4) 5lb bags @ $44.99
___ (6) 5lb bags @ $64.99
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE $7.04

IMPERIAL WHITETAIL
DESTINATION

36 LBS.-1-ACRE PLANTING

$129.98 *+ tax*
Suggested Retail $137.02
___ (36 lb.) quantities of Imperial Whitetail Destination
TOTAL *(Add 7% Sales Tax)*
$_____

YOU SAVE UP TO $20.01

IMPERIAL WHITETAIL
IMPACT SOIL AMENDMENT

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

$59.99 *(8.5lbs)*
Suggested Retail $39.99 ***+ tax***
$149.94 *(25.5lbs)*
Suggested Retail $169.95
___ (8.5lbs) of Impact $59.99
___ (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 ***+ tax***
$159.99 *(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 $19.02

SLAY HERBICIDE

• 4 OZ.-1 ACRE
• 1 PINT-4 ACRES

$57.98 *(4 oz.-1 acre)*
Suggested Retail $72.99 ***+ tax***
$149.98 *(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: _____

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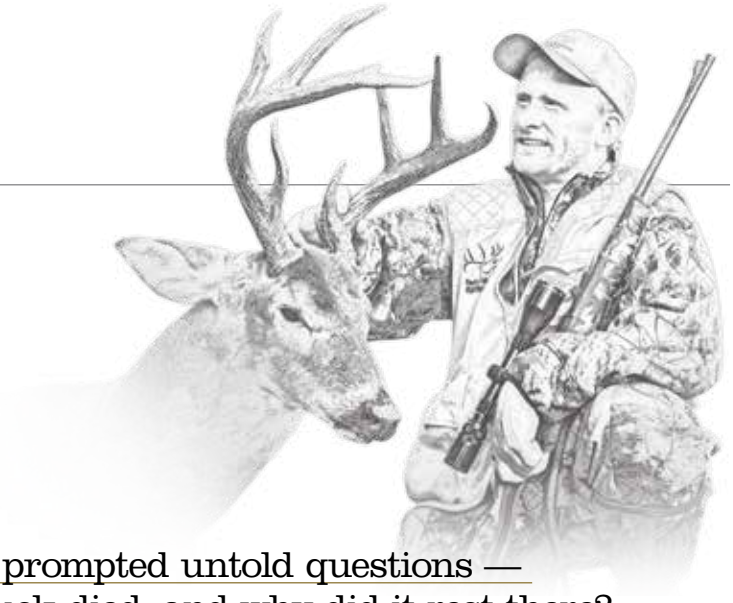

SALIENT PUZZLES

The discovery was disappointing and prompted untold questions — foremost among them, why had the buck died, and why did it rest there?

As I reached the point, frustration had overtaken patience, and I hurried a bit, anxious to slip through the tangled mass of brush and vines that blocked my path.

Maybe that's why I didn't see it immediately.

At least that's my excuse. But although I was in haste and not scanning the ground for antlers, it would have been tough to overlook the bleached-white skeleton of the buck, which glowed like a lighthouse along a midnight shoreline.

The sight startled me at first. In fact, I muttered something in shock before extricating my backpack from the brush and rushing to examine the bones. I've stumbled across dead deer before, of course, but perhaps not one with such sudden impact. The remains of the long-deceased 9-pointer — I'd guess him in the low 130s, but I'm often wrong — were stretched across a bare spot at the tip of a point that dropped off several hundred feet to a valley below. The spine, ribs, forelegs and neck had been stripped clean by coyotes, but some rotting skin remained on the head. The back legs had been ripped apart and picked bare.

Obviously, the discovery was a disappointing coda on the day. I'd started hours earlier by looking for sheds at a nearby creek bottom, later making the climb up the snowy logging path to an opening near the property line. Tracks indicated substantial recent activity in the area, so I felt foolish optimism about finding a shed or two. Doing so, I thought, might reveal which bucks had survived gun season and help connect the dots regarding travel and feeding patterns.

Quick walks along a couple of ridges and associated funnels had revealed nothing but more tracks and a scrape I'd somehow overlooked in fall. Realizing darkness would arrive before I could scour the entire property, I'd decided to focus on areas where bucks might likely drop antlers — fence lines and thick stuff — and also snoop around suspected bedding areas that would grow too thick by late spring to investigate. Before long, I had ascended to the peak of the ridge and mulled about the southern fence a bit. After finding nothing, I then backtracked along the base of a deep drainage split by two points. Deer had used both ridges as travel routes during autumn, and I suspected many — including several good bucks that only seemed to appear on camera at night — bedded where the points dropped off in a thick, gnarly mess.

Soon, I'd headed east, trying to monitor the deepening gully to the south while keeping an eye out for antlers ahead of me. The property line skirted the southern slope of the drainage, so I also paid close attention to my whereabouts via GPS. No need to meet the neighbor under bad circumstances.

Plodding along, I found a few trails and rubs, but nothing that revealed anything. Still, with the point nearing, I resolved to finish the trek there and snoop around for bedding activity. That's when the dead buck sneaked up on me. And a day set aside for solving mysteries suddenly morphed into a riddle.

The foremost question, of course, was how the deer had died. It had no visible wounds — not that an arrow or bullet would have left a mark on the remaining bones. Further, it had been dead for quite a while. CWD is prevalent in that area, so maybe that was the culprit. But maybe not. The next pressing question was whether I'd seen the deer before on trail cameras. I was fairly certain I had, as it had a telltale crab-claw nontypical point on its left beam. More investigation would be necessary, though.

Above all, though, I sensed a strange tinge of regret. I'd had no encounters with the buck during archery or gun seasons, and I hold no illusions about the type of death most deer endure. Still, seeing the bones stretched before me and holding the buck's antlers, I wished I'd had more history with the deer, as finding its remains might have provided some closure to a long tale instead of merely opening an enigma.

But hopes don't equate to reality. And with the sun drooping low, I grabbed the deer's head and shuffled toward the valley floor. Maybe the old boy had passed on his genes for several seasons, fulfilling his role in the continuing cycle. And perhaps I'd glimpse one of his progeny someday, maybe putting a dramatic stamp on his legacy.

Neither were guarantees. In fact, feeling the heft of the skull and rack in my hand, the sole, grim assurance in the vast picture seemed plain.

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