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Earl Says...

Although every day the high temps are in the 90's and just doing simple yardwork leaves you in a puddle of sweat, it's never too early to prepare for hunting season. It seems strange to say that but you're only as good at any venture as your preparation.

We were exhibiting at an Outdoor Show in Birmingham recently and it was fun to see some of the new products and services available to us hunters. I always go into these shows saying I'm not going to spend any money but then my credit card slips out and I've made a new purchase. I am really good at finding something that I just can't live without. And it can be just a simple thing like the magnetic bracket I bought to attach to my shooting house so my gun won't fall over or get bumped. Do I really need this? That's questionable but I was really pumped when I saw it. And as I said earlier, I couldn't live without it.

And speaking about being prepared, I also bought a couple of hand-made game camera stands. The guy who sold them to me said he had to come up with a stand for his game cameras because his hunting land had been clearcut and he didn't have a tree to place his cameras. Well guess what? Loggers are clearcutting my property as we speak. Looks like this guy invented this new toy just for me. Or not, but it sure is fun making new discoveries.

Andy Whitaker
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Cover photo by Dave Edwards



Imported Fire Ants and Their Impact on Wildlife

By Jeremy Meares

Jeremy Meares is a certified wildlife biologist and manager of Westervelt Wildlife Services. Jeremy received both his B.S. and M.S. degrees from The University of Georgia specializing in deer management.



I would wager there are not many people who have not experienced the pleasure of being introduced to the pure joy of being stung by fire ants. Such joy that immediately elicits responses that often include four letter words. These little bundles of joy are extremely aggressive and have become ingrained into our lives whether in our yards, at home, or in the woods we hunt and manage.

Background

In the early 1900's, two species of imported fire ant made their way to the port of Mobile, Alabama from South America. The black imported fire ant came on the scene around 1918, while the red imported fire ant surfaced sometime between 1930 and 1940. Unfortunately, a predator capable of keeping their populations in check missed the boat ride. Today, imported fire ants inhabit most of the Southeast.

In the Southeast, most imported fire ant colonies are monogyne, or single queen. Monogyne colonies are territorial. A multiple queen form was discovered in the 1970's and is more commonly found in Florida and Texas than other parts of their range. Multiple queen colonies (polygynous) have significantly more ants in an area than the single queen form. Imported ants in multiple queen colonies are not territorial and will visit other mounds.

As the imported fire ants spread across the landscape, our native fire ant species have been displaced due to their aggressive nature, high reproductive capabilities, and lack of predators. In addition, imported fire ants have been blamed for reduction of wildlife populations, crop damage, livestock mortalities, property damage (electrical equipment), and even human deaths. The economic impact of these insects has been estimated in the billions.

Problems/Issues

Evidence suggests red imported fire ants impact a variety of wildlife species including reptiles, amphibians, birds, and mammals. Truly assessing the impact of red imported fire ants is challenging and very few studies have combined replicated experimental treatments with an adequate spatial and time scale. As a result, many studies have been opportunistic and observational.

Reptiles and Amphibians

Life history traits make reptiles and amphibians susceptible to fire ants. These traits include egg-laying and the associated disturbance of this activity and delayed hatchling emergence. Some studies have shown fire ant predation on hatchling gopher tortoises. Predation occurred post hatching but they had not yet reached the soil surface and completely emerged from the egg. While predation is a direct impact, there are also indirect impacts from these fire ants that are more difficult to quantify. Impacts such as reduced survival and



Evidence suggests red imported fire ants negatively impact a variety of wildlife species. However, truly assessing these impacts is a challenge.



Hatchling gopher tortoises are especially vulnerable to fire ant predation. Photo: nokuse.org

weight gain, behavior changes, changes in foraging patterns, habitat use, and food availability. The first evidence of indirect impacts seen in reptiles was documented in American alligators. Researchers wanted to prove fire ant stings were having an impact on hatchling alligator survival and body mass. When compared to a controlled laboratory environment, hatchlings emerging from nesting material containing red imported fire ants showed significantly less weight gain. The nests containing fire ants also received less maintenance by females resulting in reduced nest success. This study was replicated in Louisiana with similar results.

A particularly sensitive species being impacted by fire ants is the gopher tortoise. Recent research in Georgia reports similar impacts as those previously mentioned. In this study, all eggs that were depredated by fire ants contained skeletonized remains of fully developed nestlings. This supports previously reported results showing fire ants not being able

to penetrate intact eggs, but they seem to be very successful in locating nests prior to hatchling emergence. This study suggests in areas where vertebrate predators are present, hatchlings may spend more time in burrows making them more susceptible to fire ant predation. This becomes a double-edged sword because if the hatchlings leave the burrow to flee fire ants, they become vulnerable to vertebrate predators. Part of this study utilized fire ant bait treatments in enclosures. Hatchling and nestling survival increased in the treatment areas. Treatment for fire ants on a large scale most likely is not feasible. However, with the highest predation risk being shortly after hatching, managers might be able to focus efforts to treat fire ants during the hatching season (August-October).

Red imported fire ants can potentially pose both direct and indirect impacts on turtle species. This can be especially important. Indirect impacts were noted in a study that documented a female

abandoning a nest after being stung by fire ants. Direct impacts again include predation. Most of the documented predation evidence deals with hatchlings. However, there have been instances of adult turtles being predated. Some behaviors, like the relative immobility of box turtles coupled with a tendency to close their plastron when threatened, make them susceptible to potential predation. There are gaps even in a tightly closed shell that allow ants to enter and swarm. Most of the research on imported fire ant impact on turtles has involved sea turtles.

The average number of hatchling sea turtles entering the water per number of eggs (hatchling release rate) was 15% lower in nests infested with fire ants. It is assumed that fire ants entered the nests just prior to hatchling emergence and attacked the hatchlings as they pipped (using their beak to break through the egg shell). Other studies documented fire ants stinging and consuming loggerhead hatchlings, while



Red imported fire ants have been blamed for declines in a number of species including the Southern Hognose Snake. Photo: srelherp.uga.edu/snakes

others showed evidence of wounds on the flippers and heads of hatchlings from fire ant stings. While amphibians appear to be a vulnerable group to the impact of imported fire ants, few studies have been published documenting such. Impacts to snakes and lizards have received more attention.

Red imported fire ants have been blamed for the decline of the Texas horned lizard, southern hognose snake, and a species of kingsnake in Florida. For all these species, population declines coincide with the invasion of red imported fire ants. However, experimental evidence confirming this is lacking to date. Impacts to these species include direct predation of young similar to turtles but also decreasing prey availability.

Birds

As with the abovementioned species, both direct and indirect impacts from fire ants have been documented in birds, with most of the emphasis being on northern bobwhite. As with most controversial wildlife management topics, research results on red fire ant impacts on quail widely varies. Some of the varying results seen from research are mainly a product of the differing varieties of imported fire ants involved. Studies in Texas have shown population-level impacts on quail from the multiple queen form and a negative correlation between the number of years a county had been infested and trends in quail abundance. Mound densities in areas with the multiple queen form are significantly higher than single queen. Research has documented impacts on quail including chick predation, reduced weight gain and survival due to ant stings, irritation during resting and feeding behaviors, and competition for insect food resources.

This led researchers to investigate impacts of the single-queen forms more commonly found across the Southeast. A study utilizing Christmas bird counts from Georgia, Florida, and South Carolina was coupled with sites that had

at least five years of pre- and post-fire ant invasion data. Results showed that quail abundance was nearly four times greater across a wide band of the Southeast prior to fire ant invasion. Northern bobwhite populations had no significant trend in abundance prior to invasion but declined significantly post-invasion. If landscape changes were primarily responsible for declines, it would be expected to see declines both before and after fire ant invasion. Early research on quail focused on direct predation of hatching chicks during the pipping process similar to what was seen in sea turtles. Additionally, more recent studies have documented that direct predation may only play a small role in imported fire ant impacts on vertebrates.

Researchers are wrapping up a study in the Florida Panhandle and Southwest Georgia looking at the impacts of red imported fire ants on northern bobwhite nest survival. Nest loss due to red imported fire ants varied between geographic locations. Overall impacts of fire ants on nest survival were low (4% average loss for the sites combined). These low loss rates may not seem biologically significant but in years when loss rates attributed to red imported fire

ants reached 15% this loss becomes more meaningful. Given fire ants usually depredate nests at the pipping stage, this is primarily affecting nests that have almost made it to hatching. This impact is important because it means a greater time investment by the breeding pair and when the nest is lost, less time is left in the breeding season to re-nest. They also reported fire ant predation correlated with warmer and drier climate conditions. In this study, when drought conditions persist, lower nest survival and loss to red imported fire ants increased.

Indirect impacts of fire ants on quail needs more research. Hispid cotton rats are an alternate prey species for predators of bobwhite and fire ants are known to predate cotton rat young. Past research has documented changes in cotton rat behavior and habitat use in response to red imported fire ants. If alternate prey species are being impacted by fire ants, this could put more predation pressure on quail and other ground-nesting birds. Given the variable nature of the reported impacts on quail, during most years, fire ant control is not necessary. However, in areas that are more prone to drought condi-



Red imported fire ants are known to depredate quail nests during the pipping process. However, the level of severity seems to vary. Photo: Brad Dabbert, www.bugmugs.com

tions, fire ant impacts may become significant and control options may be warranted. However, more research is needed to investigate whether removal actually results in lower fire ant abundance and increased nest survival. In addition, the cost of treating large acres to control fire ants may not be feasible and the potential impacts to off-target species is unknown. So, the bottom line at this point is the best strategy for offsetting nest loss due to fire ants is increasing productivity through proper habitat management.

Imported fire ants have been known to have negative impacts on water birds. Some studies comparing nesting sites for least terns treated with fenoxycarb with untreated nesting sites saw chick mortality rates reach 33% on the untreated site. Conversely, chick mortality on the treated site was only 6.3%. Researchers witnessed fire ants biting chicks and found some that had been partially consumed by fire ants. However, they were unable to determine whether the fire ants actually killed the

chicks. In addition to water birds, the research literature also documents impacts to barn swallows, crested caracara, loggerhead shrike, common ground dove, black rail, blue-gray gnatcatchers, eastern towhees, indigo buntings, northern cardinal, yellow-billed cuckoos, and black-capped vireos.

Mammals

Most of the research investigating imported fire ant impacts on mammals has been done with rodents and mostly in Texas. However, one study (in Texas) looked at fire ant impacts on fawn recruitment. The design was five pairs of 500-acre study sites where one site in each pair was treated with hydramethylnon (Amdro®). Fire ant abundance and fawn recruitment were monitored both pre- and post-treatment. Following treatment, fire ant populations were reduced and fawn recruitment was documented being higher on the treatment sites compared to the untreated. They also showed fawn recruitment to be negatively associated

with June fire ant abundance indices. One year after treatments ceased, fire ant populations were similar between the once treated sites and the untreated. There were no detectable differences seen in fawn recruitment. The researchers suggested two possible driving forces behind these results. One being possibly blinding and incapacitating injury because of fawns' "freezing/hiding" behavioral reaction to danger. The other being the irritation of fire ant stings caused them to move increasing their susceptibility to coyote predation. The authors reported a direct observation of a fawn running across a pasture with an apparent irritation on its hindquarters and upon capturing it, noted fire ants on the fawn's hindquarters.

Some wildlife species are clearly more vulnerable to the effects of fire ants and are capable of seeing population-level impacts than others. For most species, the hatching/birthing period seems to carry the highest risk. Egg-laying and ground-nesting species are far more vulnerable to fire ants. In

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addition, the timing of hatching can also impact the level of effects. Species hatching when fire ants are most active or have brood (increased protein needs) are more at risk.

Options for Control

Given the nature of red imported fire ants, viable options for large-scale control are limited. There are five categories of “natural” enemies of red imported fire ants. Extension professionals break them down into **parasites, pathogens, viruses, competitors, and predators.**

The primary parasite associated with imported fire ant control is the **phorid fly**. Certain species of this fly will attack fire ants attempting to inject their eggs into the ant’s body. It is expensive to raise these flies and they require knowledge to establish successfully. As a result, they are not commercially available and any releases are made by state or federal agencies. Unfortunately, phorid flies are not capable of eradicating imported fire ants. These flies target worker ants and in South America where all species of phorid flies attack and parasitize red imported fire ants, no more than 3% of the worker ants become parasitized. The hope is that these flies can suppress the daytime foraging activities of worker ants enough to allow native ant species to grow their colonies to better compete with the imported fire ants. These flies are thought to be expanding up to 30 miles per year and are now present from Texas east to North Carolina.

Scientists have discovered **pathogens** and **viruses** that are known to infect imported fire ants. A microscopic pathogen infects both immature and adult fire ants. These “sick” ants (including queens) have shorter life spans. Infected queens eventually stop laying eggs and ultimately (several months to a year) the colony declines. This pathogen seems to be transmitted by diseased ants traveling between multiple queen colonies.

Currently there are four viruses

BAITS USED FOR CONTROL OF FIRE ANTS

Brand Name (insecticide) (% active ingredient)	Rate/Mound	Rate/Acre
Amdro Fire Ant Bait (hydromethylnon) (0.73%)	2-5 Tbsps.	1-1.5 lbs.
Advion (indoxacarb) (0.045%)	4 Tbsps.	1.5 lbs.
Spectracide Once and Done (indoxacarb) (0.016%)	4 Tbsps.	22 lbs.
Come and Get It Bait (spinosad) (0.015%)	4-6 Tbsps.	2.5-5 lbs.
Distance (pyriproxyfen) (0.5%)	1-4 Tbsps.	1-1.5 lbs.
Extinguish (methoprene) (0.5%)	3-5 Tbsps.	1-1.5 lbs.
Extinguish Plus (methoprene, 0.25%) (hydramethylnon, 0.365%)	2-5 Tbsps.	1.5 lbs.
Ascend (abamectin) (0.011%)	5-7 Tbsps.	1 lb.
Siesta Insecticide Fire Ant Bait (metaflumizone)	2-4 Tbsps.	1.5 lbs.

* Source: Mississippi State University Extension



Phorid flies parasitize imported fire ants by injecting their eggs into the ant's body. Photo: S.D. Porter, USDA-ARS.

BROADCAST INSECTICIDE TREATMENTS

Insecticide (Liquid)	Brand Name	Rate/Acre
Carbaryl (22.5% concentrate)	Sevin Concentrate Bug Killer	130-260 fl oz.
Cyfluthrin (0.75% concentrate)	Bayer PowerForce Multi-Insect Killer	260 fl oz.
Gamma-cyhalothrin (0.25% concentrate)	Spectracide Triazicide Insect Killer	87 fl oz.
Permethrin (38% concentrate) Turf, Termite, & Ornamental Insect Concentrate Insecticide (granules)	Hi-Yield 38 Plus	35 fl oz.
Bifenthrin (0.2% granules)	Ortho Max Fire Ant Killer Granules	100 lbs.
Gamma-cyhalothrin (0.05% granules)	Triazicide Soil & Turf Insect Killer Granules	87 lbs.
Permethrin (0.5% granules)	Hi-Yield Kill A Bug II Lawn Granules	87-130 lbs.

* Source: Mississippi State University Extension

known to infect red imported fire ants. A **DNA virus** is currently being evaluated as a potential classical biological control for fire ants in the U.S. The theory behind a “classical biological control” is the hope of reducing the fitness of fire ant colonies, which could allow native competitor ant species to better compete for resources and maintain their territories. There are also **RNA viruses** being evaluated as well and one has caused significant mortality in col-

onies in a laboratory setting. This virus is the leading candidate for use as a classical biological control agent/insecticide. Research has shown the virus interferes with normal foraging behavior in that the worker ants quit retrieving food for the colony resulting in death of the larvae. Additionally, the queens become malnourished.

There have been cases in Texas where a competing exotic ant species has eliminated or displaced red imported

fire ants. This ant species becomes so abundant they dominate resources used by fire ants and irritate them causing fire ant colonies to relocate. **Predators** like armadillos, antlions, spiders, birds, and horned lizards have little impact on imported fire ant populations.

Other control options for fire ants include **baits** and **broadcast insecticide treatments**. Outside of lawn/garden applications, bait and insecticide treatments may not be feasible on a land-

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scape level. However, we will run through some basic information for both treatments and some common products and application rates.

When using baits, the key is to broadcast instead of trying to treat individual mounds. Using baits in early spring can be highly effective because fire ants are actively foraging at this time of year. Baits should be applied during dry conditions and when ground temperatures are between 70 and 90°F with no rain in the forecast. Fire ant baits are designed to be slow-acting to allow the worker ants to carry them back to the colony. Adult fire ants cannot eat solid food so the bait must be fed to the larvae that digest and liquefy it. The liquefied food still contains insecticide that eventually is passed along to the queen. Depending on the bait used, it may take anywhere from 2-6 weeks to obtain control. Commonly used baits for fire ant control and recommended application rates are listed below.

Broadcast insecticide treatments are contact insecticides applied over an entire area. These treatments are usually more time-consuming and expensive than baits. Broadcast insecticides may be either liquids or granules. The insecticide found in the granules moves into the soil and controls foraging ants and newly settled queens by contact. Below are some commonly used liquid and granular broadcast insecticide treatments (rates converted from rate/1,000 ft²). Not listed is TopChoice (fipronil 0.00143%) which is a granular insecticide treatment that can only be applied by professional pest control companies or a properly licensed commercial applicator. This product is costly but provides long-lasting control with only one application per year. The application rate for this product would be 87 lbs. per acre.

Landscape-level control treatments for imported fire ants is an area that needs more research. Currently the

effectiveness and “off-target” impacts are unknown. Couple this with varying research results from different parts of the country leave us with additional questions like what impacts soil type may have on red imported fire ant’s colonization and densities. Some previous studies have shown no soil type effects while others suggest sandier soils have slightly higher fire ant abundance than silty or loamy soils. Additionally, investigation into land use practices (fallow field management, farming, etc.) coupled with environmental factors (soil type, drought, etc.) is needed. Some land use practices may actually promote conditions favorable to imported fire ant establishment and spread. Until we have a better understanding of these factors (and how they interact) or a feasible biological control is developed, it appears these aggravating pests will be something we will continue to contend with at home and on the lands we manage for the foreseeable future.

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Building an Outdoor Pizza Oven for Farm Living

By Keith Summerour



Keith Summerour is a renowned architect, responsible for projects around the world including wineries, boutique hotels, private schools and some of the finest residences in the New South. His primary residence in Gay, Georgia is Towerhouse Farm, using stones culled from the land, inspired in part by eighteenth-century shot towers. Read more about his work and ideas in *Creating Home: Design For Living*, now available on Amazon at <https://www.amazon.com/Creating-Home-Design-Keith-Summerour/dp/0847858731>

I was introduced to towers and outdoor pizza ovens in the countryside of Tuscany, Italy as a young architect studying abroad. Feasting on a tomato and chunk of mozzarella cheese, a whole chicken roasting in the pizza oven, I sat looking out over the fields of wheat. The experience has never left me.

Later in life, my own farm became that romantic landscape and entertaining my friends and family around the fire brings that early life-changing memory full circle. When I decided to build Towerhouse Farm, a 70-foot tall tower near the small town of Gay, Georgia, even my relatives were skeptical. Comments like “I don’t get it,” and “who would ever buy it?” changed as soon as they saw the symmetry, beauty and functionality of the finished structure. The setting is equally stunning, a rural expanse of rolling woods and farmland filled with life.

Friendly gatherings and cooking outdoors are a time-honored tradition in our mild

Southern climate, and I was recently inspired to use scrap from old farm equipment to build something similar to that oven I first saw in Tuscany. Growing up in rural Alabama gave me the unique perspective I needed to build a pizza oven fitting our own rustic sensibilities.

Rustic Italy Meets Southern Ingenuity

The traditional wood burning oven is really a simple design. A dome with a

small chimney slightly forward of center pulls the heat from the fire, which is built to the back of the oven, up and over the cooking surface. This convection effect saturates the meat, vegetables, bread and pizza with a wonderful, smoky flavor. The heat from the oven can be quite intense, so that cooking a pizza can be done in just two minutes, a whole chicken in just half an hour.

I built the inner workings of my pizza oven with the half dome of a 500-gallon propane tank, the same type used to

make BBQ smokers. I welded a 4” steel pipe to the dome and cut a half moon opening for the door, keeping the door slice of steel and welding a handle on it to finish the oven’s access hatch.

I placed the half dome on top of a rock platform behind the outside fireplace at 48” above the ground to make it easy to look inside the oven. Over the steel half-dome, I added two layers of fire brick and a layer of stone. This acts as insulation so the oven does not lose heat too quickly.





It's important to use very smooth firebrick as the base of the pizza oven because this will be your cooking surface. You can also add a pizza stone afterwards, on top of the firebrick platform, to aid in heating the cooking area.

I must admit, there was one drawback to my impetuous design. Using scrap farm parts had an unintended consequence: the steel half dome expands when in use, creating micro-cracks in the stone exterior. There are no ill effects to this expansion that I can tell but it's certainly worth noting.

If I had it to do over again, as they say, I would have used the firebrick over a temporary dome and avoided the steel altogether. Hindsight is 20/20, but the experiment has been an unqualified success in happy times and good food!

Versatile Outdoor Oven Makes More Than Pizza

I love to use the oven when we have a lot of kids at the farm. We can cut and slice vegetables (from the garden in summer), mozzarella, and sausage from



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our pig hunts and let the kids make their own pizza on pre-made pizza crusts. The joy it brings to the kids is wonderful and later as the heat reduces I can roast vegetables and chicken in cast iron pans for the adults.

As guests wait for dinner, there's plenty to see. Wildflowers (some farmers might call them weeds, I suppose), sunflowers, corn, millet, soybeans and seasonal produce are interspersed with the ever-changing tapestry of the woodlands. One of my favorite things about the sunflowers is the wildlife they attract. There are days when tens of thousands of blackbirds come in big, swooping waves and descend on the sunflowers and trees.

From the tower, guests have a breathtaking 360-degree view. Most of the land you can see is held in its natural state, a gentleman's agreement between myself and three other landholders to create a hunting preserve for future

generations. We see all kinds of wildlife from the vantage of the tower. One of my neighbors joked that it makes a helluva deer stand. It's true the property was originally intended for hunting, but it's become so much more.

I grew up outdoors, and if I could be outside all the time, I probably would. The pizza oven gives me an opportunity to be out of doors just a little longer. This addition to my farm has brought much joy and has entertained many fine folks over the years. But mostly, as I sit on my wood bench and watch the sun

set over my hayfield, keeping one eye on the fire and another on the rustic setting far from the city streets, I find the piece of heaven which feeds my soul. May this simple cooking ritual, well placed in your country home, give you the same.



Making the Case for Native Plantings

By Robert Hoffman

Robert Hoffman is a Restoration Ecologist and Wildlife Biologist for Roundstone Native Seed, LLC. He travels the eastern United States consulting and promoting the use of native species for a variety of land uses. For more information contact Roundstone Native Seed at 270 531-3034.



Native grass planting

Establishing native plant species can be especially challenging if you use traditional planting methods like those used to establish commodity crops and food plots. If you have ever planted natives, then chances are you have failed at least once, or had less than ideal success. I can still remember my first attempt to establish natives on my dad's farm over a decade ago. We disked the site multiple times and had a smooth seed bed just waiting for seed. Then we hooked up to the 3-pt spreader and had the fence drag on standby. I loaded the seed into the spreader and gave my dad the signal to fire it up and head to the other end. As soon as he fired up the PTO, the seed shot 30 feet into the air and came down in a mushroom cloud with most of the seed landing in a 15-foot wide circle behind the tractor; the rest probably landed a few counties over as the wind carried it away. Needless to say, the planting did not go very well. Many of you reading this will be biologists and land

managers, but some of you are new landowners and professionals who have not yet made some of these mistakes. Hopefully this article will save you some time and money in your first attempt at planting natives.

Background

First, let me provide some background to make sure we are all on the same page. When I refer to native species, I'm talking about the species that were in the United States before European settlement. I am also mainly talking about the grassland species and

the early successional plants found in the grasslands that were commonly kept open by fire from the Native Americans. These native species have traits developed by the environment and natural selection and have not been bred for characteristics like height, seed production, or color. Many of the species we deal with today like Fescue, Bermuda, or Bahia were selectively bred for a certain trait including fast germination, growth, and sod-forming characteristics. We have grown accustomed to planting something and expecting to see it growing within 2-3 weeks of planting.

Conversely, natives can have a 30-90 day germination window. So, if you plant two native seeds side by side and give them water on the same day, one may germinate on day 30, and the other may not sprout for another 60 days. Natives have slower growth habits than most non-natives and do not establish much top growth or foliage the first year. They are, however, putting an extensive root system down, which will allow them to survive droughts and later protect the stand against the invasion of non-natives. Some native species, especially the wildflowers, have to go



Native grass and wildflower planting.

through a process called **cold moist stratification** before they even germinate. In nature, the plant produces seed, and the mature seed falls to the ground and may sit there until the next spring or summer. During the winter those seeds are going through cold moist stratification: the moisture in the cooling and warming soil is breaking down the seed coat and allowing it to germinate. This slow germination and growth can allow non-native species to quickly outcompete a new native planting. The most crucial thing for your native planting is to control those unwanted species before planting your seed.

Over the years, native plantings have become more popular as landowners and managers realize food plots alone are not the answer to their wildlife management goals. Native grass plantings often contain more than just grass species and are not just for deer, turkey and quail habitat. With just a little change in the seed composition, you can tailor your mix to help promote diverse wildlife such as songbirds, pollinators, or even fish. Yes,

even fish. A native seed mix around a pond edge can make a human-made lake look more natural and provide critical habitat for native fish species. A native grass buffer also plays a critical role in filtering the water before it enters your creek or lake. We not only use native plantings for wildlife habitat, we also use them in construction sites, erosion control, forage and even landscaping.

Wildflowers

Native grass plantings for your habitat project should contain not only grasses but also wildflowers. Wildflowers are not just for the pollinator plantings, they belong in almost every wildlife habitat project. Deer are bedding and fawning in these native grasses, but it is the wildflowers that are providing high protein browse throughout your property. Turkey, quail, and songbirds need a high protein diet for feather development when they are young and the wildflowers (especially legumes) attract protein-rich insects and produce seed. Pollinators need a variety

of wildflower species flowering throughout the season for essential nectar production. The increasingly rare Monarch butterflies need milkweed plants as host plants for the larvae, as well as nectar plants for the rest of their entire life cycle. Even pond and lake edges benefit from wildflowers as they provide food sources like insects, insect eggs and larvae for the aquatic wildlife. The wildflowers are a critical part of creating habitat. However, they are just one component of a healthy habitat, so I do not recommend going with just a wildflower mix. The grasses and sedges provide erosion control, nest sites and cover for many different species. Even some pollinators use grasses and sedges as host plants and overwintering sites. In my opinion, the only time grasses and sedges should not be included in a mix is when the natural seed bank is dominated with native grass seed.

An increasing number of landowners are recognizing the benefits of a native planting on their land and are deciding to give it a try. These projects, however, are often

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rushed and fail to meet the landowner's goals. Here are the top three common mistakes people make when planting natives.

Improper weed control before planting

Weed control is the most crucial part of

a native planting. It is important to know what is located on and around your site, species can float in from a long distance away and colonize your perfectly prepared seed bed. All too often people underestimate non-native plants, just as we did when we disked our land to make

a smooth seed bed and planted our natives. Within four weeks of disking the area, it was flush with new weeds because we did not pay attention to the plants that were in and around the plot, and because we did not perform any needed treatments on the site to remove unwanted





Improper late summer mowing.

seeds from the existing seed bank.

Seeds can lay dormant for decades in the soil and will germinate once they are exposed again to the appropriate amount of light and moisture. This dormant seed is commonly referred to as the seedbank and non-natives, as well as undesirable natives, can be very prevalent here. To counteract this, we prefer to spend an entire growing season, when possible, treating unwanted competition. This allows us to conduct multiple treatments on cool season weeds like fescue, brome, clovers, and treatments on warm season weeds like

Johnson grass, foxtails, and crabgrass. Since seeds can last in the soil for decades, you need to allow as many of them to germinate as possible in order to decrease that seed bank. Not only does this give us time to reduce the seed bank of non-natives but it also allows us to see any beneficial native species that are present so we can adjust our recommendation to incorporate these into the planting. The number of treatments and how long we spend treating the site changes based on several factors, including existing vegetation and current and historical land use. It will take

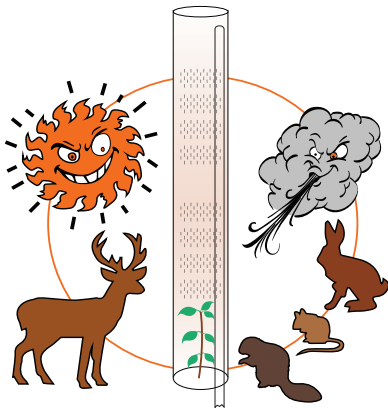
fewer treatments and time if planting after a commodity crop like corn or soybean versus planting into a fallow field or pasture. The weed control of the cropping system has been depleting that existing seed bank. In pasture land with sod-forming grasses (fescue, brome, bahia, etc.) you can have weeds hidden in the seed bank. This sod forming grass can suppress other invasive or non-native weeds and once the sod is removed a new crop of weeds shows up. An example of this would be where we once removed a thick sod of fescue from a hay field and had an explosion



Native Drill showing openers and depth bands.

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of the invasive *Sericea Lespedeza*. Later, I found out the site used to be a farm for *Sericea* seed. Without a doubt, improper weed control is the number one reason for stand failures.

Planting too deeply

Most native species need to be planted at a depth of about 1/8 inch or less and will not germinate if planted more than a 1/4 inch. If utilizing the conventional till method the site should be culti-packed or rolled over at least 1-2 times to create a firm seedbed on which to broadcast the seed. After planting the seed, roll or culti-pack the site again to ensure good seed to soil contact. A good rule of thumb is that you are not ready to plant until your footprint is less than a quarter inch deep. Otherwise, you will plant the seed too deep. If no-till drilling, use a drill that has a native grass box, trash plows, and openers with shallow depth bands. These will allow you to accurately calibrate the seed mix and make it easier to keep a shallow planting depth. Planting

in wet conditions is not recommended because it is too easy to plant the seed deep when the wheels and openers sink into the mud. This mud can also quickly clog the openers, preventing the seed from falling into the furrow.

Improper establishment year maintenance

Many people plant their seed and walk away until fall. During this time, non-native weeds and undesirable vegetation can choke out the stand. Some extra maintenance the first growing season can save your planting from this weed pressure. Non-natives are faster growing species than most natives so they can grow taller and shade out the new planting if left unattended. Top clip the site a few weeks after planting at about 4-6 inches and continue to mow at 8-12 inches, or just above the emerging natives, every 3-6 weeks the first growing season. **Top clipping** is what we refer to as maintenance mowing above the seedlings as they begin to grow. Once the natives have taken hold and

you have very little weed pressure, you can change the mowing regime to mowing half of the site each year. Another common mistake is forgetting to top clip the first growing season and then trying to bush hog it in late September after all the weed seed has matured. At this time, the vegetation can be 6 feet tall, and when you mow it down to 6 inches, it covers any new seedlings with a large thatch layer that smothers them.

I will never forget my first failed native grass planting on my family farm, and I can promise you this, I had the best 15-foot-wide circle of Partridge pea anybody could want! These three factors are the main reasons we see native plantings fail for our Do-It-Yourself clients. But if I had to reiterate the top reason for the majority of stand failures again, it would be improper weed control. Roundstone has over 22 years of experience in growing, installing and managing natives' species so by now we can confidently tell you what works and what does not.



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Footprint rule of thumb.

The Smallmouth Bass



By Scott Brown

Scott Brown is a biologist and regular contributor to *Wildlife Trends Journal* with over 30 years experience in research and managing natural resources throughout the Southeast. Scott founded Southern Sportsman Aquatics & Land Management in 2007 and now has clients from Texas to Florida, and into the Carolinas. Scott can be reached at scott@southernsportsmanaquatic-sandland.com or (336) 941-9056.

The smallmouth bass is rare in small private ponds and lakes. But with the right layout and water temperatures they can create a fishery like none of your neighbors have. Photo courtesy of Tyler Heath

The smallmouth bass (*Micropterus dolomieu*) is in the Black Bass Family Centrarchidae, and it is a close relative to the largemouth bass (*Micropterus salmoides*). Many say the smallmouth bass is a stronger, harder pulling, longer fighting sportfish than the largemouth and is highly sought after, only second to the largemouth bass in angling effort. Several pond and lake owners have (some successfully and some unsuccessfully) tried to create a smallmouth bass fishery in their private lakes and ponds. It can successfully be done, but the right water temperature, water chemistry, habitat and forage needs to be present before it should even be attempted.

Biology and Life History

The smallmouth bass is native to the eastern half of the United States and southeast Canada from Manitoba and Quebec south to the Tennessee River system in

Alabama and west to eastern Oklahoma. It has been widely transplanted by professional and recreational managers and occurs in almost every U.S. state and many other countries. It is not as widespread as the largemouth bass. The smallmouth bass is the second largest member of the sunfish family, reaching weights of almost 12 lbs. Only the largemouth bass, which reaches weights of over 20 pounds, is a heavier black bass species. The World Record smallmouth bass was caught from a lake in Tennessee, weighing 11 lbs., 15 oz. in 1955.

Smallmouth prefer deeper water than the largemouth and areas of clear, flowing streams and pools with gravel/rubble bottom. In waters cohabited by both smallmouth and largemouth, the largemouth bass will spawn a little earlier due to the fact that the shallower nesting sites they choose are protected areas with emergent vegetation and reach the



Designing and laying out this smallmouth lake required planning and knowledge of the species before the water ever started flowing. Besides rocks from the property, this landowner also incorporated man-made concrete pipes for underwater smallmouth habitat.



These areas provide either hiding, feeding or spawning habitat for the smallmouth bass. Things not normally found in your typical manmade pond.



warm optimum spawning temperature sooner than the deeper, rockier sites chosen by the smallmouth. In confined areas such as a pond or small lake these two cannot coexist, as the largemouth will out-compete the smallmouth for food, slowly reducing smallmouth numbers until they disappear or become insignificant in the population. Smallmouth bass can live about 8-12 years in natural systems. The farther north, the longer they live, but the slower they will grow.

Smallmouth bass are identified by the clearly connected dorsal fins, scales on the base portion of the soft rayed second dorsal fin, and an upper jaw bone that extends only to the middle of the eye. This mouth size difference enables the largemouth to out compete the smallmouth bass at an earlier age for

Crayfish are a favorite food of the smallmouth bass, but can be difficult to establish in your pond. They may require restocking if quality crayfish habitat is not available or the smallmouth population becomes too dense for the crayfish to support.



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A combination of shoreline habitat and underwater habitat (some breaking the surface) makes this lake extremely productive and aesthetically pleasing. Photo courtesy of Tyler Heath.

forage. The coloration is also distinctive with the smallmouth being more brownish than the largemouth, where the largemouth is more greenish. The smallmouth also has faint vertical bars on the body (prominent in the young), while the largemouth has fairly wide streaks of oval or diamond shaped markings or blotches down the midline of the sides. In both species, the colors may vary in intensity or be absent in individuals based on time of year and

various biological factors in that area. The smallmouth has bars radiating back from the eyes, and though similar bars may be present in individuals of other black bass species, including the largemouth, they are more prominent and more consistently present in the smallmouth. The eyes are red to orangish in color. Young smallmouths have a distinctive band of orange at the base of the tail. This is followed by a black band with the tip of the tail being white

or yellow.

The smallmouth bass often inhabits cool water streams, lakes and reservoirs. They are rarely found in small ponds or lakes less than 25 feet deep or in any water that is continuously murky or polluted. Smallmouth bass prefer water temperatures that remain below 80° F. However, they have been documented in water temperatures near 90° F. I only recommend stocking smallmouths where water temperatures will



These one-inch smallmouth grew to be almost nine inches the first year. The start-up seems slow waiting for the lake to fill and forage to multiply, but once the young fish are introduced there is no limiting factor. The overabundance of forage allows them to grow at accelerated rates. Photo courtesy of Tyler Heath.

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remain cooler. Taking a temperature and dissolved oxygen profile throughout the summer before stocking is recommended to avoid any unnecessary work and/or expense if it will not work in your waterbody.

Smallmouth bass begin preparing to nest in spring as water temperatures in the outer edges and deepest parts of the littoral zone (shallow shoreline areas) approach 60°F. Males create the nest on gravel, small rocks or another hard surface near drop-offs or underwater structure. They do not like nesting close together like bluegill. Mature females may lay 2,000-10,000 eggs. Males may spawn with several females on a single nest and will re-nest if the first nest is unsuccessful (due to drastic water temperature drop or flooding), or if weather

allows for a second nesting period, they may have multiple successful nests in one year. Eggs usually hatch in three days depending on water temperatures. Males guard the nest from the time eggs are laid until the fry begin to disperse (approximately 10 days total). As with black bass, fry begin to feed on zooplankton, switching to insects and their larvae and eventually to fish and crayfish. The more abundant these food items are in your lake, the more smallmouth bass the waterbody will support and the faster they will grow.

Management

For the greatest success, your waterbody objectives will have to be entirely addressing smallmouth bass. These fish are slow reproducers and slow growers

compared to the largemouth bass and other common species. Eliminating largemouth bass from an existing waterbody is mandatory, or creating a smallmouth fishery in a new lake can be achieved without introducing largemouth. It is also recommended that waterbodies up-stream from the smallmouth pond be rid of largemouth bass so they cannot be washed in from upstream flooding or natural migration. To remove largemouth bass, use rotenone (fish toxicant) applied by a licensed and insured professional. Applying Rotenone at lethal levels to remove all fish present is necessary, as a partial treatment will not work. You cannot hook & line or electrofish all the largemouth bass out of an existing waterbody. What little literature there is



The artificial fish attractors help smallmouth bass by providing areas to loaf and the rip-rap in the background help harbor crayfish, their favorite food.

regarding smallmouth bass in ponds advises that these two species will not co-exist in a pond.

To be successful with raising quality smallmouth bass providing quality water chemistry, habitat and forage is crucial for success. The presence of clean water, hard bottom, gravel, larger rocks like rip-rap and even boulders will help the smallmouth. Some habitat will benefit the fish directly, and some will benefit the forage species it needs to flourish. Smallmouth do not need flowing water, but they do prefer water with no sediment (suspended dirt particles), but the waterbody can have a mild to medium algae bloom. Hypereutrophic (excessive algae bloom) water is not ideal for smallmouth growth and reproduction. Good dissolved oxygen levels from top to bottom in the water column is required. This can be achieved by installing a bottom aeration system. When water temperatures approach 80° F these fish will be seeking deeper, cooler water and the more oxygen present, the better

for the fish.

Most small lakes and ponds lack the smallmouth habitat and it needs to be added. This is much easier with a dry lakebed (either new or old lake drained) than a full lake. Boulder piles in various depths can provide hiding areas for smallmouth bass. These surfaces can also be areas where algae and small invertebrates will be for juvenile smallmouths to feed. Rip-rap along the dam will provide areas for crayfish to hide, feed and reproduce. The rip-rap will also help prevent erosion on the dam. Gravel (#57) along the shoreline in 4-8 feet deep water near cover or drop-offs will supply the smallmouth bass with bedding areas. Beside boulders found on your property, concrete rubble or pipes can also be used if available to improve habitat.

Smallmouth bass like soft finned fish such as fathead minnows, golden shiners, threadfin shad, crayfish and large insect larvae for forage. They do eat bluegill, but they are only the consumable size for a short period of time

before they get too large. Large bluegill can be a competitor for forage with small smallmouth bass. We have seen lakes with bluegill and smallmouth bass do well when both are present with abundant quality habitat and forage for the smallmouth. If you are lacking much of the previously mentioned habitat, stocking redear sunfish may be a better alternative for your particular situation if bream are desired. At minimum, stock forage fish species and crayfish the fall prior to smallmouth stocking and if possible stock forage a year before smallmouth are stocked to allow the lake to have maximum forage available for new smallmouths. Recommended crayfish stocking rates are 50 lbs. per acre for forage. If small bass are stocked, it will be a while before they can utilize crayfish due to their size. Once crayfish begin reproducing they will provide smaller forage and become beneficial to smaller smallmouth bass. For larger waterbodies, this crayfish stocking rate can be reduced to help cut costs. Fathead minnow stocking rates are 1,000-2,000

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per acre. Threadfin shad can be stocked at 1,000 per acre if there is a supporting algae bloom. There are few hatcheries around the country that supply smallmouth bass and locating a hatchery and reserving your smallmouth bass in the fall prior to stocking is advised. Stock Smallmouth bass at a rate of 50-100 per acre (depending on fish size). Obviously, the larger the better for survival. They are more expensive per fish, but you would stock the lower rate so the costs may be nearly the same. Do not stock smallmouth smaller than two inches. Continually monitoring forage and restocking when necessary will be required to keep smallmouth numbers up and growth rates accelerated.

Harvesting these fish (thinning the population) is not as important as with creating a quality largemouth bass fishery. Once a good smallmouth population is established, removing a few fish where the bottleneck occurs may be necessary. This is identified by large numbers of same size fish being caught and they are skinny.

How to catch

There is nothing more enjoyable than catching large smallmouth bass on light tackle or fly rod. Small-to-medium flies, similar to area insect species, small-to-medium beetle spins, medium hook with split shot fished on bottom or suspended by float with minnow or small shiner works well. Crayfish and hellgrammites fished on bottom also work well for catching smallmouth bass. If available, we suggest circle hooks to prevent bass from swallowing the hook and increasing hooking mortality. Smallmouths also can be caught with night crawlers hooked through the collar and fished like a plastic worm, but allowed to rest on bottom for longer periods of time. During winter, mid-day when waters at the surface get warmed

Although small, this fish is mighty. Hopefully in several years it will be caught again and give some unsuspecting angler the thrill of the catch. Photo courtesy of Tyler Heath

by the sun, small to mid-size topwater lures work well. If your waterbody has water at the upper end of the smallmouth's temperature range, they may slow or shut down feeding for a while, or only feed in deep water. As your fishery develops and the more you fish it, you will learn how the fish react at various times of year.

Creating a smallmouth bass fishery is easier done on a new or recently drained lake than converting most existing waterbodies. It is also recommended to try if you have multiple lakes on your property and have a traditional fishery or "meat" lake with largemouth bass, bream and catfish, with this being a "specialty" lake.



Wildlife Trends Journal Management Calendar

By Dave Edwards

August/September 2017

Dave Edwards is a certified wildlife biologist and regular contributor to *Wildlife Trends Journal* and other hunting/wildlife publications. Dave was honored as QDMA's 2007 Deer Manager of the Year and nominated in 2011 as Alabama Wildlife Federation's Wildlife Conservationist of the Year. Dave is General Manager for Cabin Bluff Lodge and President of Tall Tines Wildlife & Hunting Consultants, Inc. Contact him at Dave.Edwards@CabinBluff.com or 912-464-9328.



Making sure your skinning shed is fully stocked and ready should be an annual pre-season activity

Prepare skinning shed for deer data collection

Deer season is right around the corner. Collecting information from deer harvested on your property can provide valuable insight to the status of your herd, the progress of your management strategies, and assist in making harvest decisions that will improve the deer herd and ultimately the hunting. Making sure your skinning shed is fully stocked and ready should be an annual

pre-season activity. At a minimum, you should be collecting age (jawbone), weight, antler measurements, and reproductive data. Supplies needed include jawbone extraction tool, pruning loppers, wire basket to air-dry/store jawbones, sharp knives, permanent markers, pencils, weight scale, gambrel/rope for hanging deer, flexible measuring tape, instructions on how to collect and store harvest data (recommended if more than one person will be collecting

the data), and harvest data sheets to record the information collected. General preparations may include sharpening and lubricating pruning loppers, calibrating weight scales, inspecting and/or replacing rope or cables used to hang deer, ensuring water source is working properly, and stocking/organizing the data collection area. The **Quality Deer Management Association (QDMA)** or **Forestry Suppliers** are great places to purchase

supplies to collect harvest data including harvest data sheets. Collecting and analyzing harvest data is often the backbone to the success of a deer management program.

Manage mid-rotation pine stands with herbicides to improve food and cover for wildlife

Although thinning pine plantations improves wildlife habitat by promoting development of food and bedding/escape cover, the responding vegetation

often includes species such as sweetgum, waxmyrtle, gallberry, etc. that shade out and reduce desirable forage plants/vegetation over time. An effective technique to control undesirable hardwood competition, and promote quality deer foods, is through the use of herbicides such as imazapyr (Arsenal™). An application of imazapyr will minimize hardwood competition and promote development of higher quality wildlife food and bedding/escape cover within treated areas. While you can apply this herbicide

throughout the growing season, it is most effective if applied from late summer until leaf drop in the fall. Furthermore, research has shown that one treatment of imazapyr can significantly increase growth and production of the remaining pine trees by final harvest, hence, generating a return far outweighing the cost of the treatment. Treating entire stands may be most practical from a timber production standpoint, but is not necessary from a wildlife perspective. For example, in a thinned pine plantation, simply apply-



Applying selective herbicides in mid-rotation pine stands will minimize hardwood competition and promote the establishment of high quality wildlife habitat plant communities.

ing herbicides via skidder/tractor down select thinned rows into the adjacent pine rows can significantly increase the quality and quantity of deer browse and ultimately raise the nutritional carrying capacity of the area. Once pine stands are treated, a prescribed burning rotation should be established thereafter. This technique is often referred to as a “mid-rotation” release. It is reducing hardwood competition and ‘releasing’ the pines for better growth. I often use this strategy (herbicide followed by fire) to create natural food plots within middle aged pine plantations. These areas create lots of great habitat and thus exceptional hunting opportunities for deer and turkey.

Condition and train hunting dogs.

Each September thousands of hunters and their dogs go afield and begin their hunting season. In many parts of the United States, particularly in the Southeast, September is the opening month for dove and early teal season, with shooting preserve quail season starting in October in many areas. In the Southeast, where temperatures in the nineties are not uncommon, all hunting dog owners need to condition their four legged friends beforehand and be familiar with the dangers a working dog can face in these conditions.

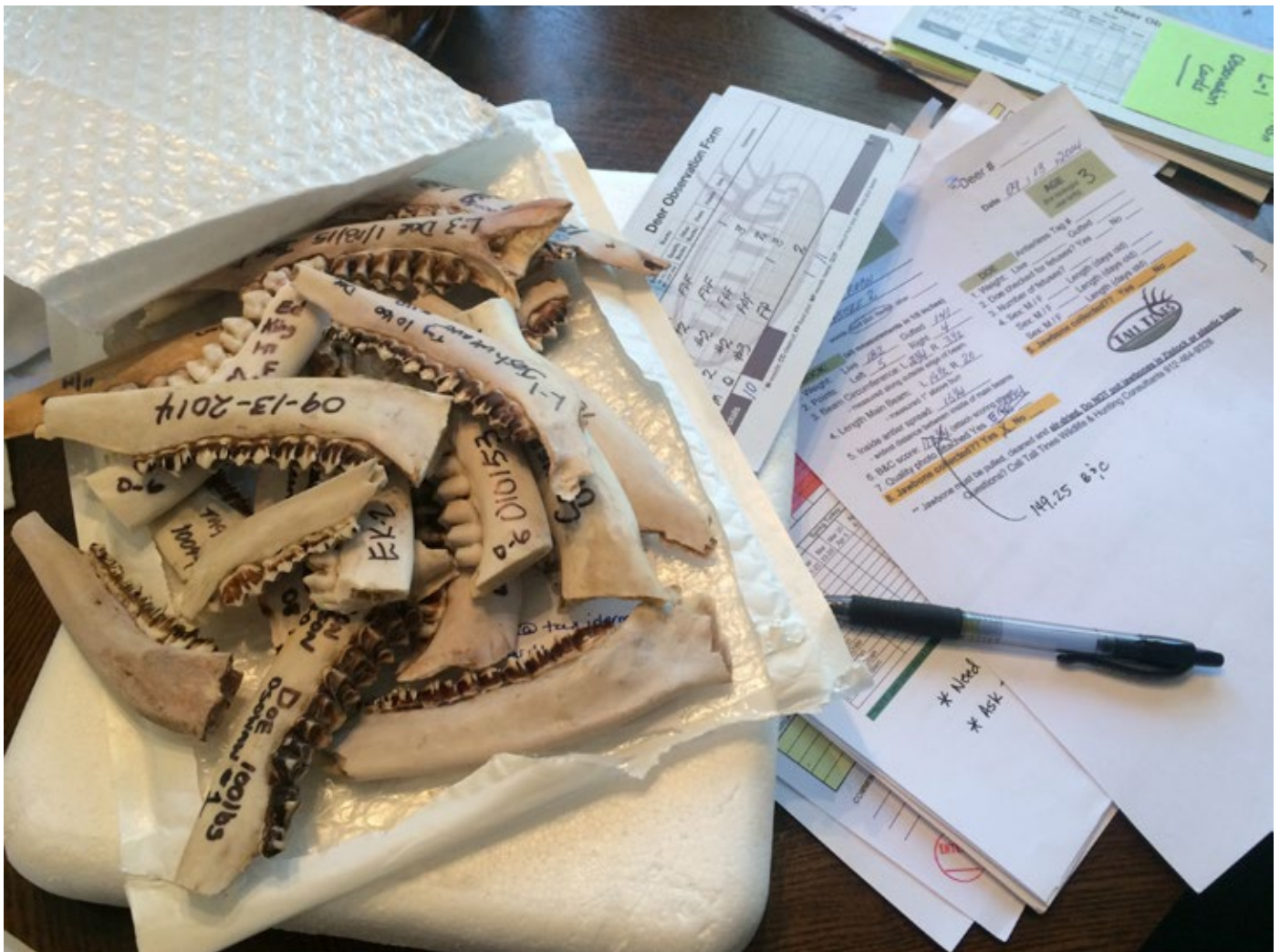
Many professional gun dog trainers recommend a warm weather training

regimen of an hour in the morning and another in the evening. Run your dog and work on retrieving drills, building slowly as you go. Just as when you are starting a fitness program, workouts should start out slow and easy. Make the workouts fun and if needed, take frequent rest and water breaks. As in any training process you want to increase the duration gradually as the dog increases his endurance and becomes accustomed to the heat.

The onset of heat related problems can be quite subtle, so it is important to keep a watchful eye on your dog while training or hunting in warm weather. The different types of common heat-related problems that may be encountered while training and hunting are,



Hunting dogs are like athletes and need conditioning before they compete. With dove and early teal season approaching, now is the time to start working your dog(s) to ensure they are ready.



Monitoring the status of your deer herd is the backbone to the success of your deer program and hunting quality.

heat stress, heat exhaustion and heat stroke. If your dog is not performing at his normal level, slow in reacting to your commands, panting, or simply lays down and does not want to get up, get him out of the sun and into a shaded area, allow him to rest and give him water in small quantities frequently. If there is a waterhole nearby, encourage the dog to get in it to cool its body temperature. We often provide our dogs with GATORADE or Pedalyte which helps replace electrolytes – similar to a drained athlete.

Check, repair and prepare deer stands for hunting season

While the best time of year to relocate or place new deer stands on your property is in late winter after the deer season has ended or very early spring (before green up), late summer or early

fall is when you need to revisit these stands to tighten them back up, inspect for loose nuts/bolts, rotten or loose wood, or any other safety hazards. This is also a good time to check the shooting rails, padding, replace pull up ropes, and trim shooting lanes where needed in preparation for hunting season. However, do not over do the shooting lanes. Small openings are all that is normally needed to identify and shoot deer. Because we have so many deer stands on the property I hunt, we have started using flagging as a way of ensuring each stand is safe. That is, once a stand is checked, tightened, etc., we simply tie a piece of colored flagging on the base of the stand or the ladder. We use a different color each year. For example, this year we are using yellow flagging. So if you get to a stand this fall that does not have a piece of

yellow flagging on it, you know that it has not been through “final inspection” this year and to use caution if you use it.

Develop a pre-season deer harvest plan that will maintain or improve your deer management program.

Monitoring the status of your deer herd is the backbone to the success of your deer program. Hopefully you have been collecting harvest data (weights, measurements, ages, etc.), hunter observation data, as well as conducting camera surveys. Collectively, this information is used to make sound deer management decisions that will help you achieve the goals of your program. If you haven’t already done so, ask a wildlife biologist to review your data or information and provide harvest recom-



Late summer is a great time to deploy trail cameras to capture photos of bucks while they are still in bachelor groups.

mendations before hunting season starts. Using trail cameras is a great way to assess buck quality and make buck harvest decisions before you head to the woods. Pictures from trail cameras will help reduce “mistakes” when judging bucks in the woods while hunting (where judgments are often made in seconds while your heart is racing 200 beats per minute!) While trail cameras are useful, a true camera survey is the most accurate method available to assess the status of your deer herd. September and October are normally the best months to conduct a camera survey (after bucks shed velvet but before the majority of acorns start to drop). If you plan to conduct a survey this fall, be sure to plan ahead. If you are doing it yourself, begin gathering all

the equipment and supplies needed (cameras, batteries, digital cards, film, corn, etc.). If you plan to hire a professional, get on their schedule early. With the popularity of camera surveys, most wildlife consulting companies are booked well in advance of camera survey season (September – November).

Begin flooding duck ponds in early September.

Teal are usually the first ducks coming down the flyways as they migrate south for winter. Although it depends on where your property is located, you should expect to start seeing teal in late August through mid-September. To accommodate these waterfowl and/or to attract them for the early teal hunting season, flood at least 30% of your duck

pond. To be most attractive, make sure there are some open water areas within the flooded area. The main reason for not flooding the entire duck pond is to delay seed deterioration caused by flooding. Seed deterioration rates, or the amount of time it takes for a seed to break down after being flooded, vary among different plant species. Most native wetland plant seeds are well adapted to flooded conditions and will last up to 3 months under water. However, most agriculture crop seeds break down much quicker. Thus, you only want to flood enough of your pond to provide early arriving teal with a food resource. Begin flooding the remainder of the pond in late October for the main flight of ducks. This will ensure the seeds you’ve worked hard to

produce will remain longer into the winter to provide food and attract ducks. If you have never shot early season teal, you're missing out. Teal respond to calling and work decoys well and they fly in fast, tight flocks which makes for some fast and furious shooting – notice I said shooting and not killing!! – they are tough to hit!

If you added annual clovers to your food plots last fall, September is the time to apply management to regenerate the food plots.

Incorporating re-seeding annual clovers into your fall plantings will allow you to extend the plot's wildlife value by providing quality food sources through early summer. Without them,

fall plots of small grain such as winter wheat and oats generally become less productive and thus less valuable for wildlife by early spring. If you have planted annual clovers such as crimson or arrowleaf clover, allow them to flower and seed out – which normally occurs in April – June depending on which growing zone you are in. The flowers are important for game birds, particularly quail and turkey poults. Flowers attract insects which are an important component in the diet (source of much needed protein) for very young turkeys that were hatched this spring. Although plots generally get weedy after the clover has seeded out (which isn't always a bad thing), leave these plots alone until early fall. About three weeks to a month prior to planting time,

mow the plots as low as possible, allow a week or so for the weeds to start growing again, and apply glyphosate (RoundUp) to knock them out and prep the plot for re-planting. If weeds were thick, you may consider burning the thatch off to expose bare ground (burning also enhances clover seed germination). Once the weeds die (or have been burned off), spread fertilizer, lightly disk the plot to expose bare ground and “stir up” the residual clover seed from last year, then plant annual small grains (wheat and oats). The key to the whole process is to not disk the food plot too deep. After the first planting, and if you've allowed last year's clover to seed out, annual clovers will re-seed and come back every year – which not only provides great nutri-



This food plot had annual clover last fall and has been mowed, then sprayed to kill summer weeds and grasses. With a light disking, annual clovers will germinate and establish another clover stand this fall.

tion and extends the life of your fall annual plots, but will save you money on seed.

Install trail cameras to capture photos of deer

Depending on where your property lays in the whitetail's range, antler hardening (shedding of velvet) has already taken place or will shortly. Late August or early September is a great time to begin installing trail cameras around your property to capture photos of bucks. During this period, bucks are congregated in loose bachelor groups allowing you to photograph multiple bucks together. Where to place the cameras depends on local food sources and deer activity. In some cases, attracting deer to a camera site with scattered whole corn is most effective. However, mineral licks that were created earlier in the year often make great camera locations, particularly if you have experienced wet conditions. Other locations that may be effective in late summer or early fall include entrance trails to large

agriculture fields, along the edge of smaller food plots of perennial crops, summer food plots, or small water holes (if weather is warm and conditions are dry). Naturally, most hunters are anxious and excited to plug the SD card into a computer and run through the photos to see what kind of bucks they have, which is what I do. However, take time afterwards to do a little analysis of the photos. By counting the number of bucks and does in the photographs you can get an idea of the existing adult sex ratio which will help you make harvest decisions. Estimating the age of the bucks you photographed will shed light on the buck age structure. Obviously, a full scale camera survey will provide the most accurate and comprehensive information about the deer herd, but "random" trail camera photos certainly has a story to tell and can help you better understand the status of the deer herd on your property. All of this allows you to make better management decisions that lead to desired results.

Prune secondary roads

Because the growing season is essentially over, early fall is a great time to trim over-hanging limbs from your property's interior roadways. Interior or secondary roads can become a jungle in just one growing season if not maintained. Have you ever ripped the exhaust pipe off your tractor with an overhanging limb, or had a limb slap you across the face while driving a golf cart down an overgrown road? Trimming limbs will help prevent equipment damage and/or personal injuries while using these roads. Removing these limbs will also help these roads dry out quicker by allowing sunlight and wind exposure on the road and in some cases will enhance natural wildlife foods along the roadsides due to the added sunlight.



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