



# NOBLE NEWS & VIEWS

## SPECIALTY AG

# Fall Webworms Are Back! Here's How to Control Them

By Steve Upson, senior soils and crops consultant | [sdupson@noble.org](mailto:sdupson@noble.org)



**W**hile visiting growers in mid-June, I started noticing quite a bit of fall webworm infestation in native pecan groves as well as in backyard pecan and fruit trees. If early populations are any indication, we can expect a lot of defoliation heading into the fall.

The range of trees attacked by this pest is impressive. Worldwide, more than 600 kinds of deciduous trees have been attacked. Favorites in Oklahoma include pecan, hickory, walnut, crabapple and persimmon.

### FIRST GENERATION

#### SPRING/SUMMER

- Female moths can lay up to 500 eggs on both sides of the leaves.
- Larvae hatch and then feed for up to 50 days.
- Larvae then form webs as they feed on the leaves.

### SECOND GENERATION

#### FALL/WINTER

- When left to feed, colonies can completely defoliate a limb.
- Larvae continue feeding in fall.
- Pupae winter beneath loose bark.



A pecan tree sustains damage caused by fall webworms.



### THE WEBWORM CYCLE

Entomologists tell us that webworm outbreaks run in cycles. Some years outbreaks are severe, while in other years they are barely noticed. Weather, birds and the predatory insect population contribute to the circular nature of these outbreaks. Heavy, driving rains can flush the worms from the foliage early in the season, reducing the level of damage.

Two generations of fall webworm caterpillars can occur in the Southern Great Plains. The first generation usually appears from June through August. If a second generation is produced, it can extend into October.

This pest overwinters as a pupa in a cocoon concealed in ground litter, cracks and crevices, or in the soil. Following mating, female moths usually deposit their egg masses on the undersurface of the leaves. Larvae hatch in approximately seven days. They immediately begin to spin a small silken web over the foliage on which they feed. In the initial stages, the small, hairy, yellow-brown worms feed only on the leaf's upper surface; but as the size of the caterpillar increases, the whole leaf is eaten. As they grow, the web grows to enclose more and more foliage.

For the first half of the 4- to 6-week period during which the caterpillars feed, all feeding occurs in the web. As caterpillars near maturity at 1 3/4-inch long, they leave

the web at night to feed.

During the final development stage, caterpillars leave the web and crawl to a convenient hiding place, such as a thick patch of bark or the leaf litter at the tree base, where they pupate.

### HOW TO CONTROL WEBWORMS

During most years, a fall webworm infestation can be ignored, especially if it is in a large, mature tree in good condition. When small trees are attacked, they can be severely defoliated and can even be completely encased by webs. In most cases, complete defoliation will not kill the trees. However, if small trees are not well established or are experiencing any type of severe stress, defoliation can result in death, especially if it happens twice in one season. On pecan trees, nut production and quality can be reduced if severe infestations are not controlled. Removal of webworms in small yard trees can be accomplished using a rake or a long pole equipped with a hook to pull down the webs. If within reach, a web located at the tip of a branch can easily be pruned out and destroyed. Do not attempt to burn the webs out as you may cause additional damage to the tree and possible personal injury.

Insecticide applications are most effective when the caterpillars first hatch and the webbing is still small. Because the webbing

is not very noticeable early in the life cycle, you must be intentional in your scouting efforts during this time.

Several classes of insecticides are labeled for control of fall webworms. However, many of these spray materials, including pyrethroids, are harmful to predatory insects that aid in webworm control.

*Bacillus thuringiensis (Bt)* sprays are a safer alternative and ideal for use in home situations. Bt is most effective when applied to small caterpillars. Unless the webbing is widespread, it is not necessary to treat the entire canopy. When treating isolated webs, spray the leaves next to webs. As these leaves are incorporated into the webs and eaten, the Bt will be ingested. The molting disrupter class of insecticides, including the brand name products Confirm and Intrepid, are recommended for control of fall webworms in commercial pecan plantings for the same reason; they target caterpillars and will not harm beneficials. Orchards sprayed to control pecan nut casebearer using molting disrupters in May to early-June seldom experience significant fall webworm infestation.

Fall webworm populations vary from year to year. Several strategies and techniques are available to control this pest. Early detection is important when controlling heavy infestations of webworms. 🇺🇸





WILDLIFE

# High-Tech Traps Are Worth the Investment

By Josh Gaskamp, wildlife and range consultant and technical consultation manager  
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**F**eral hogs have plagued agricultural lands in Oklahoma for long enough that most landowners have adopted some sort of control strategy on their properties. Many natural resource management experts recommend an integrated approach as a best practice to control feral hogs. An integrated approach uses many different control strategies in unison to have a cumulative population reduction. But is the continued use of some techniques causing more harm than actually reducing populations?

## CHEAPEST AND EASIEST IS NOT ALWAYS BEST

From my experience working with landowners and land management entities, I have found that many control campaigns start with the cheapest or easiest available option. For example, a landowner may use hunting as their first line of defense because they already own a rifle and box of ammunition. Or a landowner may use a box trap because the welding shop down the road has one for \$300. Often, control strategies like the aforementioned are conducted for recreation



instead of management. When used to control feral hog populations, they are among the least effective options.

Using conventional animal-activated box and corral traps may present new problems after initial trapping efforts. Consider a sounder (group) of hogs approaching a box trap. The average-sized box trap can capture only a handful of hogs, at best. When a portion of the sounder enters the trap and triggers the gate, the naive segment of the sounder is captured, leaving the wary (trap-shy) segment on the land. Because of this, feral hog populations continue to become more wary than the previous generation and harder to capture.

Many producers balk at the price tag on high-tech, human-activated traps, but perhaps these techniques are justified. Many of the high-tech traps are capable of capturing entire sounders when users follow best management practices and are disciplined to delay trap activation until all of the hogs enter the trap.

### SO IS A \$6,000 TO \$8,000 TRAP WORTH THE INVESTMENT?

In a research study conducted here at the Noble Research Institute, researchers demonstrated that intensive trapping with such traps reduced rooting damage by 90 percent. In a scenario where several acres of wheat is unable to be harvested due to feral hog damage, the reduction in revenue on a crop that yields 30 bushels per acre at a price of \$3.50 or \$6.50 per bushel would cost the producer \$105 and \$195 per acre, respectively. In 35 bushel per acre of soybeans, at a price of \$8.50 or \$11.00 per bushel, losses are expected to be \$300 and \$385 per acre, respectively. Many producers aren't just managing one commodity, so these losses stack up and are expected annually if feral hog populations persist.

Specialty crops, such as pecans, are another major group of agricultural crops that receive damage and depredation from feral hogs. In a recently completed study, researchers from the Noble Research Institute and Oklahoma State University used GPS collars to track feral hog use in pecan orchards. Preliminary data suggest that feral hog rooting in pecan orchards can result in greater economic losses (\$870 per acre) than the aforementioned commodities. Further results from this study will be highlighted in the November issue of *Noble News and Views*, along with economic loss data that will be built into an online calculator for estimating losses because of pecan harvester efficiency.

### HIGH-TECH TRAPS CAPTURE MORE FERAL HOGS

Feral hogs impose significant economic burdens on both crop and livestock producers. It is often assumed that a high-tech trap is just a Cadillac type of trap for the user who wants a cool, new toy. Some producers may see it as an expense that will not be recovered, but these human-activated technologies are actually a more



## BOARBUSTER TRAPS

**116** HOGS PER TRAP AVERAGE IN 2017

The BoarBuster suspended corral trap is one high-tech control option capable of removing 88 percent of a feral hog population. In 2017 alone, reporting BoarBuster users in Oklahoma captured 3,724 hogs in 32 traps.

effective tool to mitigate damages long-term and save money. High-tech traps can reduce populations by more than 80 percent. Because conventional traps are animal activated, 50 percent is an ambitious population reduction goal that is not likely to be met. Producers removing 80 percent of a population will extend the time before feral hogs re-invade because hogs have to immigrate, not just reproduce, to fill the void in the short-term. Producers trapping only 50 percent of a population typically continue to experience significant damage expenses every year. 🐷





## LIVESTOCK

# Raising vs. Buying Replacement Heifers

By Jason Bradley, agricultural economics consultant | [jwbradley@noble.org](mailto:jwbradley@noble.org)



**W**hen it comes to getting replacement females for your cattle herd, multiple options are available. One would be to use your own cow herd and keep the heifers you need. Or

you could outsource and purchase virgin heifers from a different operation and breed them to the bull(s) of your choice. Another option is to buy heifers bred to a bull that would roll straight into your program.

Which one is the best? Like so many things in agriculture, the method that works for one operation may not be the best option for another. That's why it's so important to know what the costs are for a particular method while understanding what

benefits you'll get in return.

### PROS AND CONS

The pros and cons of any method should be considered before making a decision. With home-raised replacements, you should know exactly what you're getting. You'll also be able to sell any extra bred heifers at a higher price than feeder heifers that are not bred. The downside is it requires a much higher level of management in order to have a well-functioning breeding program, which means you need to take into account the costs and timelines for general management of your operation. It also means you're going to have an animal that's utilizing the available forage while not producing a calf, and you'll need a plan to prevent inbreeding.

On the other hand, if you purchase your replacements, there will not be any missed animal production because those heifers will be calving that year. This option also allows

for new genetics to be brought into the herd. However, there's not always a guarantee of what kind of calf you will get if you purchase bred heifers. Unfortunately, with this option you cannot guarantee the genetics of the calf that will come from the purchased bred heifer. In order to purchase replacements that increase your chances of getting what you want, you will face a higher purchase price.

### WHAT'S FEASIBLE?

Before making your decision, take a step back and decide what is feasible from your operational standpoint and management abilities. Are you able to spend more time developing the replacement type you want or would your time be better spent managing purchased replacements that don't require that commitment or resources? The options outlined here are just some of the many ways to obtain replacement heifers for your herd. 🐮





## FORAGE

# Hay Shows: A Fading Tradition With Benefits Yet to Give

By Amanda Early, agriculture services and resources assistant | [aaearly@noble.org](mailto:aaearly@noble.org)



**T**he Noble Research Institute soil and forage processing group stays busy throughout the year with both research and producer samples. However, once hay season begins forage testing for producers increases greatly.

Whether you are buying, selling or just producing hay for personal use, testing is an invaluable tool. Forage testing is also a large part of another tool that seems to be becoming a thing of the past: the local hay show. In past years, it was common for the hay contest to be a large event in county and state fairs. However, in recent years, entries have slowly dwindled and many counties no longer hold hay competitions. Even at the Oklahoma State Fair, the only hay competition is for alfalfa hay.

### LOCAL HAY CONTEST ADVANTAGES

To a producer, entering hay contests has several advantages, especially if you are selling your hay. By entering the local competitions, you can see how your hay compares to other area producers and what you could improve on. This can also be used as a great selling point to your potential customers when you list your winning entries at local, state or even national competitions. Nevertheless, other producers and prospective customers who attend the contest(s) will view your entries for themselves and reference that as a reason to contact you for purchasing your product.



### UPCOMING 2018 HAY SHOWS

The following is a list of upcoming hay shows. For more information on the local events, please contact your local extension agent. Information about state and national events is available online.

#### OKLAHOMA

- Grady County Fair Alfalfa Hay Show and Auction – Aug. 7 entry deadline
- Oklahoma State Fair Alfalfa Hay Show – Aug. 28 entry deadline

#### TEXAS

- Denton County Hay Clinic – Aug. 4 entry deadline
- Fannin County Hay Show
- Montague/Clay County Hay Show – Oct. 2
- Wise County Hay Show
- East Texas State Fair Alfalfa Hay Show (Smith County) – Aug. 9-10 entry deadline

### REGIONAL AND NATIONAL

- Southeastern Hay Contest – Sept. 20 entry deadline
- World Forage Analysis Super Bowl – Aug. 30 entry deadline



### DECLINE IN LOCAL HAY SHOWS

Although there are great advantages to hay shows, there seems to be some strong factors leading to a decline in local competitions.

County extension offices are feeling the effects of state budget cuts. Many offices have lost key staff members and some offices have closed completely, which has led to fewer people doing more work. Priorities have shifted to key programs.

When I was growing up as a 4-H and FFA member in Muskogee County, Oklahoma, hay shows and hay-judging competitions were key activities and often had large turnouts. But with these competitions came a lot of hard work and dedication to coordinate events, find sponsorships and contact potential contestants. Now with the staff shortage, program focus has shifted to areas of larger awareness such as livestock shows. Some local hay shows also require producers to donate the bales they enter. Producers may want to pick out some of their best bales for the competition, but they may not want to pay an entry fee and not get those prime bales back.

### REGIONAL COMPETITIONS THRIVE

Although local competitions have declined, regional contests such as the Southeastern Hay Contest in Athens, Georgia, seem to be gaining interest. Last year, the Southeastern Hay Contest had more than 300 entries.

I wonder if the reason for this particular competition's great participation is due to the fact that it does not require an entire lot of display bales. Results are entirely based on laboratory sample analysis and only a grab sample is required for display and to use in tie-breaker situations.

Possibly producers feel that entering a larger competition is more worthwhile than entering a local competition. Or maybe they simply enter regionally because they do not have contests in their local area.

### TRADITION COULD BE REVIVED

Here at the Noble Research Institute, we are proud to offer forage testing to support hay shows in any county. In 1999, we tested forage samples from 20 counties. Throughout the years, this number has dwindled. Last year we received hay show entries from only four counties in our area.

The hay show seems to be fading away, however if enough producers show interest in bringing back these contests then maybe we can help make them popular once more. I encourage anyone interested to talk to their local county extension agents or even to other producers to generate interest in banding together and sponsoring more local contests. Producers could also help sponsor local hay judging competitions for 4-H and FFA to help educate the next generation on the importance of good forage.

With all of the modernizations in hay production and the increase in technology to produce superior hay, there should be a way to tie in an important tradition of the past with today's modern agricultural lifestyle. But the change has to start with the support and encouragement of you, the producer. 🐄



By Will Chaney, senior research associate | [jwchaney@noble.org](mailto:jwchaney@noble.org)



To properly manage a successful pecan orchard, a well-developed plan should be implemented. Planning will help growers and managers be prepared for tasks that will need to be addressed throughout the year. This calendar can be used as a

resource to help with planning.

## AUGUST FLOOR MAINTENANCE

If weeds are a problem, an herbicide can be applied to the orchard floor. Continue maintaining orchard floor vegetation through mowing or grazing. Remove livestock from the orchard by Sept. 1 for harvest preparation.

### DISEASE CONTROL

Use the Mesonet ([bit.ly/pecan-scab-map](https://bit.ly/pecan-scab-map)) scab model to determine when to apply fungicide to susceptible varieties.

### HERBICIDE SPRAY

Continue spraying your vegetation-free strips as needed.

### PEST CONTROL

Continue to monitor for pests such as twig girdler, aphids and caterpillars. Take note of

### COMING IN NOVEMBER

Management tips for November through January will be in the November issue of *Noble News and Views*.

beneficial insects, and do not spray for aphids if the insect level is sufficient.

### HICKORY SHUCKWORM

If you have a history of hickory shuckworm, spray at shell hardening in northern Oklahoma.

### WEEVIL

Monitor traps for emergence and spray when threshold is met.

### HARVEST

Do a pre-harvest maintenance check on all harvest equipment. Remove branches and other debris from the orchard floor.

## SEPTEMBER FLOOR MAINTENANCE

Floor maintenance depends on your management system. Regardless of the system used, you should have a clean floor, free of debris that has been cut short.

### PEST CONTROL

Continue to monitor for pests such as twig girdler, aphids and caterpillars. Control of wildlife works best if started before the harvest and continued during harvest.



During this time, crows, blue jays and squirrels will be an issue. For more information on pests, visit [www.noble.org/pecan-predators](http://www.noble.org/pecan-predators).

#### WEEVIL

Monitor traps for emergence and spray when threshold is met.

#### WILD HOGS

Control wild hogs with traps like the BoarBuster trap. Learn more at [www.noble.org/boarbuster-deliveries](http://www.noble.org/boarbuster-deliveries).

#### CROWS AND BLUE JAYS

Use sound deterrents like an air cannon or a BirdGard system. Learn about BirdGard at [bit.ly/birdgard](http://bit.ly/birdgard).

#### SQUIRRELS

Control with hunting.

#### HARVEST

Do a pre-harvest maintenance check on all harvest equipment. Remove branches and other debris from the orchard floor. Start harvesting pecans as soon as 70 percent of shuck-split occurs.

#### ORCHARD MAINTENANCE

Mark trees for removal that are damaged and have small or undesirable pecans.

## OCTOBER

#### FLOOR MAINTENANCE

Floor maintenance depends on your management system. Regardless of the system used, you should have a clean floor, free of debris that has been cut low.

#### PEST CONTROL

Continue to monitor for pests. Wildlife control works best if begun before the harvest and continued during harvest. During this time, crows, blue jays and squirrels will be an issue.

#### WILD HOGS

Control wild hogs with traps like the BoarBuster trap.

#### CROWS AND BLUE JAYS

Use sound deterrents like an air cannon or a BirdGard system.

#### SQUIRRELS

Control with hunting.

#### HARVEST

Continue to harvest your pecans.

#### ORCHARD MAINTENANCE

Mark trees for removal that are damaged and have small or undesirable pecans.

#### PLANTING

Plant container-grown trees. 🐾



## RESEARCH

# Reducing Lignin Can Increase Forage Quality and Disease Resistance

By Kiran Mysore, Ph.D., professor | [ksmysore@noble.org](mailto:ksmysore@noble.org)



eliminate, lignin in forage crops. Eliminating total lignin content can severely alter plant growth and performance in

Lignin is a major component of plant cell walls that provides physical strength to plants, but, higher lignin concentrations can negatively affect forage digestibility. Therefore, it is best to reduce, but not

**HarvXtra alfalfa lines can increase forage yield by 20 percent and can delay harvest to 35-day cutting intervals compared to 28-day cutting intervals for conventional alfalfa varieties.**



the field.

Noble researchers have identified certain alfalfa genes whose expression, when altered, reduces lignin content without compromising plant yield. This discovery led to the development of HarvXtra, the first genetically engineered alfalfa with a trait to improve forage quality. HarvXtra alfalfa lines can increase forage yield by 20 percent and can delay harvest to 35-day cutting intervals compared to 28-day cutting intervals for conventional alfalfa varieties. In addition to increased yield, HarvXtra alfalfa has 14 to 18 percent higher relative forage quality when compared to conventional alfalfa varieties.

#### PLANT HEALTH

The health of reduced lignin plants in the field is a concern since lignin also plays an important role in plant defense against pathogens. There is a general

perception that lignin reduction would negatively affect plant health. Unexpectedly, we found that certain reduced lignin alfalfa lines were resistant to a few soil-borne fungal pathogens. Further investigation revealed that when certain genes involved in lignin production are downregulated, the energy is shifted to a different pathway that makes antifungal compounds called flavonoids that make the plants resistant to some fungal pathogens. Such a phenomenon has also been observed in sorghum. Therefore, targeted lignin modification can also be used in other legume and forage grasses to confer resistance against pathogens. This will provide double benefit to forage crops: increased forage quality and increased disease resistance.

#### LIGNIN BIOSYNTHESIS

There are several genes involved in producing lignin. Not all of these genes

will result in enhanced plant defense responses when downregulated. Most genes can affect the plant performance in the field when downregulated. Therefore, care should be taken to alter the expression of an appropriate lignin production gene to give resistance. The gene can also vary depending on the plant species, so extensive research is needed before selecting and altering the expression of a lignin production gene. Nevertheless, altering lignin production in forage crops holds a great promise to increase profitability to farmers and ranchers by increasing forage quality and yield. With the recent invention of gene editing technologies, targeted alteration of lignin biosynthesis in forage crops can be done in a nontransgenic manner.

HarvXtra is sold by Forage Genetics International. More information can be found at: [www.foragegenetics.com/Products-Technologies/HarvXtra-Alfalfa](http://www.foragegenetics.com/Products-Technologies/HarvXtra-Alfalfa). 🇺🇸



# THE GREAT PLAINS FIRE SUMMIT

The Noble Research Institute, Oklahoma State University and the Texas A&M Natural Resources Institute are partnering to bring the 2nd Biennial Great Plains Fire Summit to Ardmore, Oklahoma, on Oct. 1-3, 2018. The purpose of the Summit is to promote the use of prescribed fire by creating an opportunity for landowners, agencies and nongovernmental organizations to network and discuss the benefits and effectiveness of prescribed burning. Mark your calendar now in order to make plans to attend this important and informative event.



Find out more about the Great Plains Fire Summit online at [bit.ly/gp-fire-summit](http://bit.ly/gp-fire-summit) and register for the event at [noble.org/events](http://noble.org/events)

**1 p.m., Oct. 1 - noon, Oct. 3**  
**Ardmore Convention Center**  
**Summit registration cost:**  
**Producer: \$50**  
**Professional: \$100**



FORAGE

# Drought Tolerance: An Important Characteristic for Tall Fescue Persistence

By Malay C. Saha, Ph.D.,  
 professor |  
 mcsaha@noble.org



**D**rought is the most crucial constraint to crop productivity. Most of Earth's surface area is not suitable for crop production due to severe water limitations, and the scenario is likely to get worse

especially in the southern Midwest and southeastern United States. Recent climate models suggest an increase in aridity in many areas of the world. More than 35 percent of the world's land is considered arid or semiarid. Even in areas of high rainfall, crops experience water stress due to uneven rainfall distribution. Drought can cause significant crop yield loss and under severe conditions up to 100 percent crop loss is experienced.

### THE PROBLEM

The Southern Great Plains has experienced severe to exceptional drought conditions each year. In 2011, exceptional heat and drought conditions prevailed throughout the south-central U.S. (Fig. 1). It was the costliest drought to date. Drought caused \$7.62 billion losses in agriculture in Texas. At the same time, drought-related agricultural

FIGURE 1: EXCEPTIONAL DROUGHT STRESS PREVAILED THROUGHOUT THE SOUTH-CENTRAL REGION OF THE U.S. IN 2011.

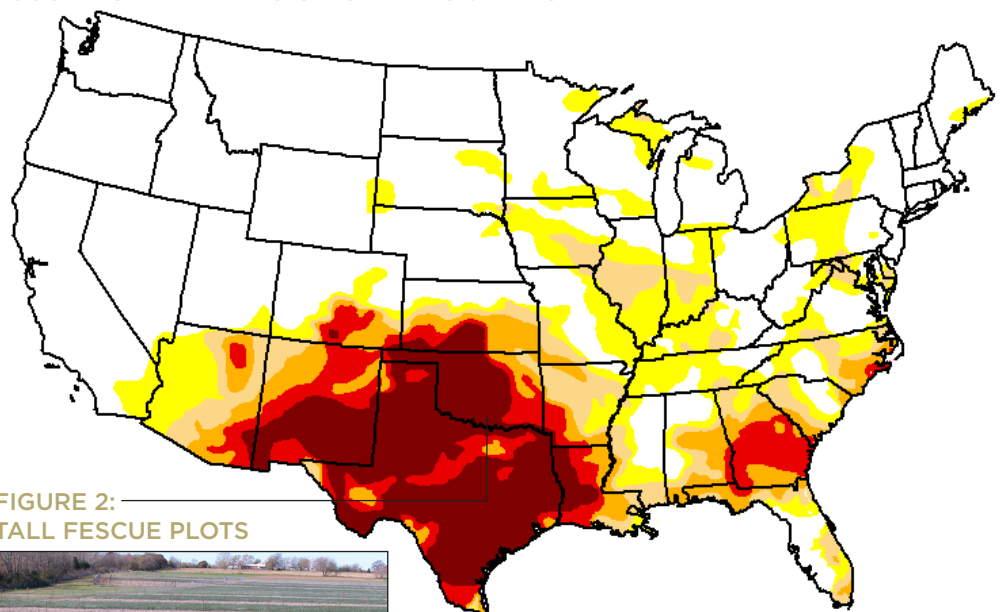


FIGURE 2: TALL FESCUE PLOTS



Tall fescue plots face drought in Ardmore, Oklahoma, in 2011. Stands of summer-active Continental were a 100 percent loss, but summer dormant varieties survived.

**\$1.6B**

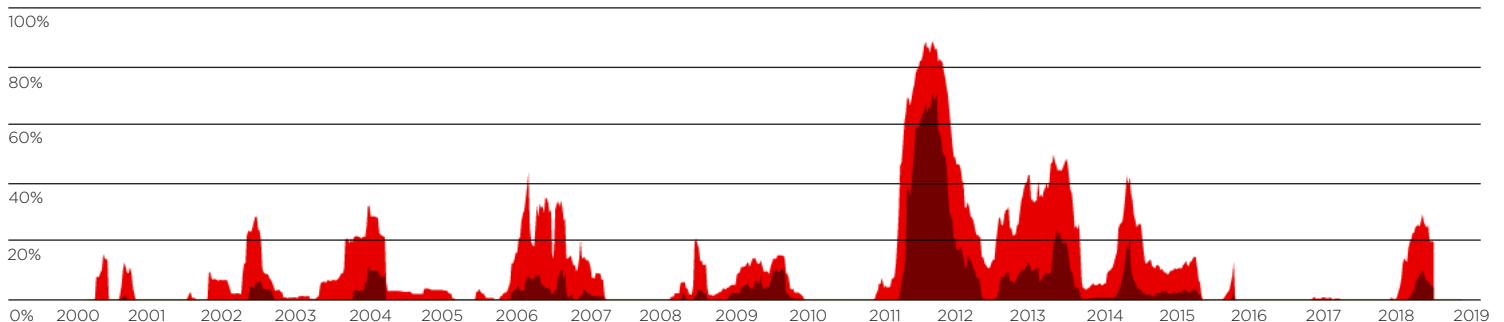
Oklahoma suffered \$1.6 billion in agriculture losses during the drought of 2011.

**\$7.6B**

Texas suffered \$7.6 billion in agricultural losses during the drought of 2011.

### EXTREME AND EXCEPTIONAL DROUGHT CONDITIONS SINCE JANUARY 2000 FOR THE SOUTHERN GREAT PLAINS

In 2011, more than 60 percent of the Southern Great Plains region was in extreme drought conditions with 80 percent reaching exceptional.







losses in Oklahoma accounted for \$1.6 billion. Developing drought-tolerant crop varieties is important for sustainable agriculture in the region.

### GROWING TALL FESCUE IN THE REGION

Tall fescue is an important cool-season perennial hay and pasture grass in the temperate regions of the world. It is also used as turf and in conservation plantings. Tall fescue is grown on more than 35 million acres in the U.S. There are two types of tall fescue. The Continental, which grows continuously during the summer, is called summer-active tall fescue. The Mediterranean tall fescue remains dormant during summer and is commonly known as summer-dormant fescue. As a perennial crop, once planted, it should persist for at least five to seven years. But 20 to 40 percent stand losses have been observed every year due to hot, dry summers that prevail in the region. In 2011, 100 percent stand loss was recorded in Continental fescue, though Mediterranean-type persisted well (Fig. 2). Thus, cultivation of Continental fescue can be restricted to higher rainfall areas east of Interstate 35. Mediterranean fescue can be grown west of Interstate 35 under extreme drought stresses. Mediterranean fescue possess a drought-avoidance mechanism; the Continental fescue lacks this characteristic.

### DROUGHT-TOLERANT TALL FESCUE VARIETY DEVELOPMENT

Drought tolerance can improve persistence

### FIGURE 3: DROUGHT SCREENING

Protocol developed at the Noble Research Institute. From left to right: A 14-inch cone with two blotting papers at 6 inches between sand and metro-mix. A cone with an established plant, both root and shoot growth can be measured. Segregation of tolerant and susceptible plants can be observed.



of Continental tall fescue in the Southern Great Plains. To develop drought-tolerant varieties, the first step is to identify drought-tolerant plants from the natural variations. At the Noble Research Institute, we have developed an effective greenhouse test for identifying the desired plants from germplasm resources and breeding populations. Using the protocol, plants with high

water-use efficiency and/or drought-tolerance were selected. Selected plants and plants from common varieties were planted in the field for the verification of greenhouse-screening results. Data collection is in progress. Genotypes confirming drought tolerance will be used to develop a drought-tolerant variety for cultivation in the Southern Great Plains. 🐄



# CURT PATE COMING TO ARDMORE SEPT. 19



## EFFECTIVE STOCKMANSHIP AND CATTLE HANDLING: ON THE GROUND AND ON THE HORSE SEMINAR

The Noble Research Institute and the Oklahoma Beef Council would like to invite all cattle producers to a seminar featuring nationally recognized cattle handling expert Curt Pate. The seminar will offer ways to work cattle in an efficient, effective, low-stress manner to enhance cattle movement, performance and handler safety. The evening will include sessions on working cattle on horseback and on the ground. A free steak dinner will be served.

**Pre-registration is requested online at [noble.org/events](http://noble.org/events)**

**5:30-8:30 p.m.  
Sept. 19, 2018  
Hardy Murphy Coliseum  
600 S. Lake Murray Drive  
Ardmore, OK 73401  
No registration fee.  
Dinner will be provided.**

Brought to you by:





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### SEPT. 18

#### Introduction to Integrity Beef

**4-9 p.m.**  
**Noble Research Institute Pavilion**  
**No Registration Fee, Dinner Provided**

Connect with Noble Research Institute consultants and Integrity Beef Alliance members to learn more about the Integrity Beef Alliance terminal calf program and replacement heifer development program. Participants will learn about the importance of protocols and record-keeping, along with the advantages of being associated with a regionally and nationally recognized marketing program.

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## UPCOMING EVENTS

For more information or to register, visit [www.noble.org/events](http://www.noble.org/events) or call 580-223-5810. Preregistration is requested. For other agricultural questions, please call our Ag Helpline at 580-224-6500.



### So You Want to Grow Series

**Pecans | Sept. 4**  
**Vegetables | Sept. 11**  
**Fruits | Sept. 18**

This series will cover various practices of site preparation, irrigation and variety selection for specialty crop production of pecans, vegetables and fruit.

**6:30-8 p.m.**  
**Noble Research Institute**  
**Kruse Auditorium**  
**No Registration Fee**



**AUGUST | 2**

#### Growing Season Prescribed Burn Field Day

**8:30 a.m.-3:30 p.m.**  
**Coffey Ranch**  
**\$25, Includes Lunch**



**AUGUST | 27**

#### So You Want to Raise Cattle

**4-8 p.m.**  
**Kruse Auditorium**  
**\$25, Includes Dinner**



**SEPTEMBER | 6**

#### Backyard Farming: Intensive Small Space Food Systems

**6-8 p.m.**  
**Small-Scale Ag Demo Area**  
**No Registration Fee**



**SEPTEMBER | 25**

#### Pecan 101 Workshop

**9 a.m.-4 p.m.**  
**Kruse Auditorium**  
**\$25, Includes Lunch**