



Technologies To Help With Harsh Weather | **3**



Spring vs. Fall Calving Season | **5**



3 Ways Seed Can Be Legally Protected | **7**

NOBLE NEWS & VIEWS

AGRICULTURE

So You Want To Grow Cover Crops:

3 Questions to Ask Before You Start



by Jim Johnson,
soils and crops
consultant |
jjjohnson@
noble.org

Cover crops have gained a great deal of popularity in the past several years. Many producers contact us wanting information about which cover crop they should grow. Before we can give a good answer, we must first ask and answer a multitude of other questions.

1. WHAT ARE YOUR GOALS FOR THE COVER CROP?

This is the first and most important consideration.

Are you growing a cover crop to keep the soil covered, provide living roots, provide habitat for pollinators and other beneficial insects, fix nitrogen in the soil, break a compacted soil layer, provide pest control, or some combination of these or many other potential goals?

Answering this question helps determine if a cover crop is the right tool to use and which cover crop plant species could be most beneficial.

2. WHAT HERBICIDES WILL YOU USE?

In order of importance, herbicide use is probably the second most important factor when considering cover crops. Many herbicides can have residual activity that will prevent some cover crops from germinating or growing well. Grazing restrictions from herbicides may be an issue too. Always read and follow all label directions.

Thought should also be given to what pesticides may be needed to control pests in the cover crop and how the cover crop will be terminated. If the cover crop has a tendency to come back as a volunteer stand, how will it be controlled and prevented from becoming a future weed problem?

Story continues on next page

3. WHAT RESOURCES DO YOU HAVE?

Before you decide to grow a cover crop, inventory your resources to determine what is feasible. Consider:

- What are your soils and weather like?
- Can an appropriate seedbed be prepared, and are planters or seed drills available?
- What is your knowledge level, skill set, time availability and management ability?
- Do you have sufficient financial assets to purchase seed and pay for other management inputs?
- Are the appropriate seeds available locally or will they need to be ordered and shipped in?

OTHER CONSIDERATIONS

For some growers, crop insurance and government farm programs may limit cover crop activities. Other complications may arise from lenders, partners or, in the case of tenant farmers, landowners. These challenges don't necessarily rule out the use of cover crops. A cover crop just needs to be well planned to work it into a crop rotation without decreasing subsequent crop yields.

Thinking through all of these considerations ahead of time will help determine if cover crops are right for you. 🐮



**WONDERING WHAT COVER CROP TO GROW?
THREE KEY QUESTIONS MUST BE ANSWERED
BEFORE A COVER CROP IS PLANTED.**

More News and Books Online

Keep up with the latest news and information from Noble Research Institute consultants at www.noble.org

You can also purchase books about wildlife, plants and more at www.noble.org/store



facebook.com/nobleresearchinstitute



twitter.com/nobleresinst



youtube.com/nobleresearchinstitute



instagram.com/nobleresearchinstitute



noble.org





SPECIALTY AG

5 Protected Ag Technologies That Help Fruit, Vegetable Growers Face Harsh Weather

by Steve Upson, senior soils and crops consultant | sdupson@noble.org



Bob Dylan penned the words to his smash hit, “The Times They are A-Changin’” in the fall of 1963. The lyrics reflected Dylan’s views on social injustices and the growing awareness that change was inevitable.

As predicted, a lot has changed since the release of

Dylan’s song, including the climate. As a child growing up in Tulsa during the 60s, I recall cold snaps lasting longer during the winter months in contrast to present day. We expected snow, and Old Man Winter delivered. Every kid on our block owned a snow sled, and we actually got to use them. Not so much today.

Story continues on next page



LEARN MORE THROUGH OUR ADULT EDUCATION

Several educational opportunities are scheduled to assist growers interested in learning more about these crops and crop protection technologies. Go online to www.noble.org/events for additional details.

A high tunnel hoop house is moved onto a raised bed plot in preparation for establishing a tomato crop.

CLIMATE IN CONSTANT FLUX

According to the Oklahoma Climatological Survey, annual statewide temperatures during the 60s, 70s and 80s were lower on average than the long-term average going back to 1895. Beginning in the mid-90s, annual statewide temperatures began to rise and have remained above the long-term average to present day. The point is: When it comes to climate, change is inevitable. The climate has been in flux for thousands of years and will continue to change.

Several years ago, I had a conversation with Al Sutherland, former Oklahoma Mesonet Agriculture program coordinator, about extreme weather events and the unpredictable nature of these events that we are currently experiencing. According to Sutherland, many climatologists believe these events are a manifestation of the current round of climate change and will continue to escalate in frequency and magnitude over time. Doesn't paint a pretty picture for agriculture, does it?

PROTECTED AG TECHNOLOGY HELPS MITIGATE RISK

Fortunately for specialty crop growers, there is a plethora of crop protection technology available to assist in these changing and challenging times. The application of these technologies enable growers to be better risk managers because they can exercise more control over Mother Nature.

Protected agriculture can be defined as the use of active and passive technologies/practices to protect crops and animals from harsh weather conditions and pests in order to maximize yields and enhance product quality.

Active technology, like greenhouses, require the input of an energy source such as natural gas and/or electricity. While greenhouses offer the highest level of environmental control, they are expensive to install and operate.

Passive technologies provide less protection but can be utilized without the purchase of an energy source. A few of these popular technologies include raised beds equipped with plastic mulch film, floating crop covers, low tunnels and high tunnel hoop houses.

WILL YOU CHANGE WITH THE TIMES?

The times, they are a changing; there's no doubt about it. The question is, are you willing to change with the times? Knowing climate-related production risks will continue to increase, will you continue business as usual or will you adopt crop protection technology in order to better manage these risks? The choice is yours.

**PASSIVE TECHNOLOGY OPTIONS****1 RAISED BEDS AND CONTAINER SYSTEMS**

Raised beds, shaped and permanent, protect crops from flooding rains by limiting the occurrence of soil saturation. The same can be said of container culture. The effectiveness of a raised bed growing system is maximized with the use of plastic mulch. With shaped beds, the mulch film cover insures bed integrity by eliminated the possibility of erosion during flooding rains.

2 CROP COVERS

Floating crop covers offer protection during frost and freeze events. These covers are light enough to be laid over the top of plants. Various thicknesses (weights) of covers can be used depending on the degree of protection desired. Depending on soil temperature and cover elevation above the soil (plant size), heavy weight covers can provide up to 8 degrees of protection. Lighter weight (thinner) covers that transmit more sunlight are commonly used to hasten crop development during periods of unseasonably cool temperature.

3 LOW TUNNEL STRUCTURES

Low tunnels are temporary hoop structures fitted with either floating crop covers or greenhouse film. They typically range in height from 1 to 3 feet depending on crop type and maturity stage. In addition to freeze protection, tunnels equipped with crop covers provide a degree of wind protection. Tunnels equipped with greenhouse film provide protection from wind and rain.

4 HIGH TUNNEL STRUCTURES

High tunnel hoop houses are low tunnels that have grown up; they are larger, stronger and can do more work. These greenhouse-sized structures are typically covered with a single layer of greenhouse quality polyethylene film. Greenhouse films can be purchased tailored to a grower's specific needs. Growers can choose a light diffusing film, a cooling film, a thermic (heat retaining) film, an anti-drip film or a combination of the above. They also have a choice of different film thicknesses and types: standard, woven or bubble. Factors used in film selection include crop(s) to be grown, location (latitude), season and service life requirements.

A fully equipped and properly managed hoop house is a working definition of synergy. When equipped with plastic mulch, covered raised beds and low tunnels, a hoop house is capable of providing a degree of crop protection greater than the sum of its parts. This synergy is the product of increasing efficiency with the layering of each technology.

5 NETTING

Another protective technology involves the use of netting to shelter crops from hail, to shade crops from intense sunlight and to reduce wind speed. Netting is available in different mesh sizes and strengths depending on its intended use. It is typically suspended over the crop using a network of cables or placed over the top of a low or high tunnel. 🐮



ECONOMICS

Consider Economics of Spring vs. Fall Calving Season

by Jason Bradley, agricultural economics consultant | jwbradley@noble.org



Have you ever stopped and thought about the reasons why you manage your cattle herd the way you do? Can you justify your calving season?

You could calve in the spring and market calves in the fall. Or maybe you calve in the fall and market in the

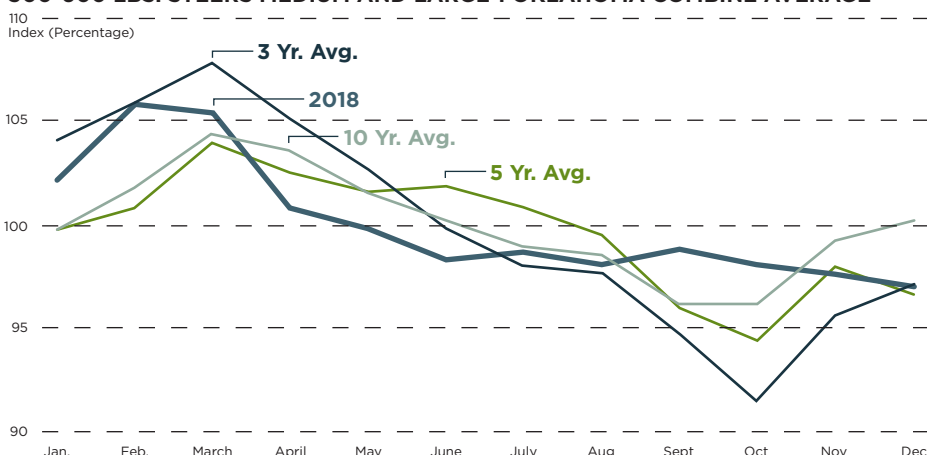
spring. Perhaps you have a continuous calving season throughout the year.

WHAT TO CONSIDER WHEN CHOOSING A CALVING SEASON

I'm not going to try to convince you that you should be using one calving season over another.

Story continues on next page

500-600 LBS. STEERS MEDIUM AND LARGE 1 OKLAHOMA COMBINE AVERAGE



Source: U.S. Agricultural Marketing Service, compiled by Noble Research Institute.



There are endless things to consider when you are looking at how and when to market your yearling cattle, including:

- Nutritional demands.
- Forage availability.
- Seasonality of yearling calf prices.
- Seasonality of feed prices.
- Availability of labor.

In the Southern Great Plains, spring calving seasons are most popular, seconded by fall calving seasons.

A continuous calving season has been shown to have more issues with management and marketing. Having a group of yearling calves that are larger and uniform in size and color has been shown to increase marketability.

SPRING CALVING SEASON REDUCES SUPPLEMENTATION

In Oklahoma, forage availability and nutrient requirements are among the top factors, outside of yearling cattle and feed prices that influence timing of the calving season.

A cow's peak nutrition requirement is going to be shortly after that calf is born. If this is in the fall, there is a good chance that more supplemental feeding will be needed in order for her to provide for the calf and be ready in time for the next breeding season. This is going to increase her annual cost. However, if she calves in

A continuous calving season has been shown to have more issues with management and marketing. Having a group of yearling calves that are larger and uniform in size and color has been shown to increase marketability.

the spring, she may need less supplementation with the availability of new forage growing.

While this may seem like an obvious choice, we have to look at the other factors.

FALL CALVING SEASON OFFERS HIGHER MARKET PRICES

By looking at an indexed price for yearling steers weighing 500 to 600 pounds (shown in the chart), we can see that having a calf of this size has a higher price in the spring compared to the fall. This is influenced by multiple factors, including more calves going to the market in the fall due to more spring-calving herds in this part of the country. This increase in supply pushes prices lower.

This causes a trade-off between the two management styles. The higher prices received by the spring yearling calves is offset by the higher management costs for that fall calving herd. The lower prices received in the fall are made up by having lower cow costs with the spring calving herd. This is why it's important to look at your entire operation and consider the other factors, like available labor or even the weather in your area.

There are trade-offs between all management decisions you face. Understanding the seasonality of the cattle markets is just one of the pieces to the much larger puzzle of producing cattle. 🐮



SEED

Know the 3 Ways Seed Can Be Legally Protected Before You Save It



by Michael Trammell, senior plant breeder | matrammell@noble.org,
and Suresh Bhamidimarri, Ph.D., assistant professor | sbamidimarri@noble.org

Saving seed is a concept that has been around as long as farming. We usually think of saving seed as setting back seed from a previous year's harvest for planting in the following or future years. There is also the practice of setting seed aside from a prior year's harvest, cleaning it, bagging it, and then selling it to other farmers. This practice is often referred to as "brown bagging."

Some of the most common questions plant breeders get when visiting with farmers are "Can I save this seed, and if so how much?" and "Is this variety protected?" or "What is PVP?" Well, the answer to all these questions is quite simple: "It's just downright complicated."

In many cases, seed cannot be saved due to various laws or restrictions. However, there may be some cases in which seed may be saved for future use by the farmer or rancher who originally purchased the protected seed. In the United States, there are a number of legal forms of protecting seed and its use, including Plant Variety Protection (PVP), patents and contracts.

Story continues on next page



In this article, we will take a quick look at each of these methods of protecting seed. The following information is intended to provide a general overview of a very complex legal framework. It is in no way intended to provide legal advice, and specific questions should be addressed with legal counsel.

HOW DO YOU KNOW IF SEED IS PROTECTED?

Look at the label or the bag. The label or bag of a protected variety will usually read "Unauthorized Seed Multiplication Prohibited by Law." The PVP symbol may also be used to denote a protected variety. If the seed is protected under a U.S. patent, the patent number may be listed on the label or bag. Also, talk to the seed dealer or company representative from whom you purchased the seed. They may require you to sign a limited use or technology agreement restricting or prohibiting the saving of seed.

PLANT VARIETY PROTECTION

1 Plant Variety Protection is one option for the protection of seed varieties. The developers of new varieties can use a PVP to restrict the marketing and sales of new varieties. A PVP allows the farmer or rancher who purchased the seed to save seed in certain cases for replanting on their own farm or on land they rent or lease. However, that same farmer or rancher may not sell saved seed to others without authorization. And even then, the owner of the variety can specify the amount of seed to be saved and the quality standards of the seed. They may also insist on cleaning the harvested seeds at their facility in order to maintain the integrity of the variety.

PATENTS

2 A patent is another common way of protecting seed. In the U.S., patents are administered by the U.S. Patent and Trademark Office. A patent

CHECK RESTRICTIONS BEFORE YOU SAVE SEED

There are seeds out there that are not protected, but it is up to users to ensure that there are no restrictions on the seed they plan to save. Always remember these steps if you are not sure:

- Check the seed label and bag.
- Talk to the seed dealer or company representative.
- Check the seed company's website.
- Refer to any limited use or technology agreement you were required to sign.
- Consult legal counsel when necessary.

can protect a specific seed of a variety, hybrid, improved trait or a particular gene associated with a cultivar. A good example would be Roundup Ready seed. It is not unusual to see a plant variety protected by both a PVP and a patent. Most importantly, there is no exemption under current patent law that allows a farmer or rancher to save seed protected by a patent.

CONTRACTS

3 In some instances, a seed company may require the farmer or rancher to sign a limited use or technology agreement before purchasing seed. This type of agreement may prohibit the saving of seed or specify the conditions under which the seed may be saved.

In many cases, accepting the terms of a contract or agreement could be as simple as opening the bag. Just remember, as all seed companies are different, each contract has its own terms. So, be sure to read the label and the agreement. 🐮

CROPS

SEED TAGS: WHAT IS ON THEM?

by James Locke, senior soils and crops consultant | jmlocke@noble.org



You have decided to plant a crop, and now you want to make sure it gets off to a good start. A good crop starts with good seed. And much of the information you need to know is on

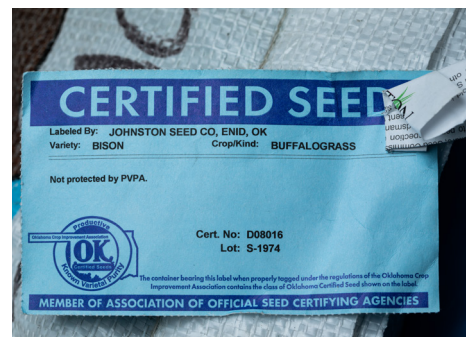
those seed tags.

There may be multiple tags, including certification, analysis and treatment tags. Certification tags are usually blue for certified seed, but they may also be purple or white for registered or foundation seed. The certification tag must include the crop, variety, lot number and owner.

Analysis tags may be separate, or the information may be on the certification tag. Analysis tags include percent purity, other crop and weed seed, and noxious weeds. Analysis will also include percent germination, hard seed and date tested. Note that the germination test is done under ideal conditions. To get a better idea of germination under field conditions, a vigor test should be done.

If required, the Plant Variety Protection Act statement may be on the certification tag, analysis tag or both.

The treatment tag(s) will indicate any fungicides, insecticides or other materials applied to the seed, and their associated precautions and handling instructions.



For more information, refer to <https://tfss.tamu.edu/for-buyers/seed-tags>.

SPECIALTY AG

Using Traps as Part of Your Integrated Pest Management Plan



by Will Chaney, pecan and specialty agriculture systems senior research associate | jwchaney@noble.org

Insect pests can cause costly problems in the pecan orchard. There are times to spray for these menaces, and you can use insect traps to help you determine when.

Insect traps are another tool in your integrated pest management plan, which you design to balance the economic and environmental considerations of your operation. Traps, if properly used, can be an effective way to monitor pest populations and determine if an economical threshold for spraying has been met. Here are some tips to consider when setting traps for pecan nut casebearer, hickory shuckworm and pecan weevil.

PECAN NUT CASEBEARER

Supply Storage

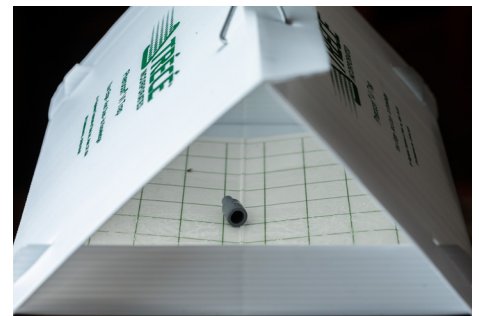
Lures can be temporarily stored in unopened, factory-sealed packages in a cool, dry place. If you are going to carryover for multiyear

use, it is recommended to put lures in the freezer. Sticky inserts should be kept in cool temperatures to prevent melting of adhesive.

Traps

Orchards less than 50 acres should have at least three traps dispersed throughout the orchard. Orchards larger than 50 acres should have at least five traps. Traps should be more than 100 yards apart. Geographic features such as bottoms or unmanaged natives might require more traps. Hang traps from branches that have terminals with nutlets. Place in an accessible location around 6 to 8 feet above the ground. The lure is a rubber septa which has been saturated in pheromone; it should be placed on its side in the middle of the sticky insert sheet that is placed inside the trap. The lure should be replaced every four weeks; when removing the old lure, discard it outside the orchard. If the sticky material has become hard and non-sticky, replace the adhesive sheet with a new lure.

Story continues on next page



Pecan nut casebearer traps should be distributed no more than 100 yards apart in the orchard.



For more information on managing pecan nut casebearer, please see the following articles:

- 2018 Pecan Management Calendar: www.noble.org/pecan-management-calendar/
- How to Manage the Pecan Nut Casebearer: www.noble.org/pecan-nut-casebearer/

Remember:

- Only use one lure per trap. Using more lures does not make it a “better trap.”
- When counting moths, you must count as recommended.
- Replace lure as recommended, every four weeks.
- Replace liner when adhesive has become hard.
- Throwing old lures on the ground can cause the moths to not go up to the trap but to another location.

HICKORY SHUCKWORM

You will see lures for hickory shuckworm that can be placed in the same traps as the pecan nut casebearer. Research has not shown the lure to be effective in trapping the hickory shuckworm, so I currently do not recommend using the pheromone traps for the hickory shuckworm.



For more information on pecan weevil management, see the pecan management calendar at www.noble.org/pecan-management-calendar/

PECAN WEEVIL**Traps**

Wire cone traps, pyramid traps and circle traps are used in the orchard for weevils. Wire cone traps and pyramid traps are on the orchard floor, which can complicate other activities in orchard floor management. I recommend the circle trap because it is installed in the tree and does not affect orchard floor management. Commercial cones can be purchased, or you can build your own from plans at <http://bit.ly/weevil-pecan>.

When installing the circle trap on a tree, place the traps on the north, west or northwest part of the tree. If your orchard is part of an integrated operation and you have cattle in the orchard, you will want to make sure your traps are high enough in the tree to avoid curious cattle. The trap can be secured to the tree by multiple options. I would recommend some type of twine, rope or even bailing wire. You can staple it to the tree but removal of the trap would cause damage to the trap. On the bottom of the trap, you should smooth the bark underneath to create a smooth connection for the trap and the tree. This will deter weevils from climbing under the trap into a crevice created by the rough bark.

Remember:

- Traps need to be inspected regularly.
- Clean insects out of the cone.
- Secure the trap to the tree and smooth out the lower connection points. 🐜





SOIL HEALTH

5 Reasons Why Soil Biology Matters on the Farm



by Jeff Goodwin, conservation stewardship leader and pasture and range consultant | djgoodwin@noble.org

Success and long-term viability for most agricultural enterprises ultimately hinges on the health of their soil. This is true for beef operations in the Southern Great Plains to row crop farms in the Midwest.

For decades, the agriculture industry has focused, studied and ultimately understood the physical and chemical characteristics of our soil resource (e.g., soil texture, soil pH, etc.).

However, until the past few years, little emphasis has been placed on the biological constituents and their importance in a healthy, functional soil.

SOIL IS ALIVE AND ACTIVE

Soil is not simply a medium to grow plants. It is a living ecosystem, and it puts on a show if you know where and what to look for.

A living soil is a complex and dynamic environment with as much drama and suspense as a Hollywood movie. A living soil features predator-prey conflicts, high-speed action and even mutual partnerships. The trouble is seeing the picture. These activities are happening everyday on the soils we stand on, only at the microscopic scale. We often hear of the cast of characters: bacteria, fungi, protozoa, arthropods, even earthworms. So what's the storyline? What do they do and why does it matter?

Story continues on next page

SOIL BIOLOGY IS ESSENTIAL TO:

1 DECOMPOSITION OF ORGANIC MATTER AND MATERIAL.

Soil organic matter stores energy and nutrients that are used by both plants and soil microbes. Organic matter is a primary food source for soil microbes and is a product of biological decomposition. One class of bacteria and fungi are decomposers, meaning they have the ability to break down organic material releasing useful nutrients. While bacteria generally utilize carbon sources that are easy to break down (like fresh plant material and plant exudates, which are sugars and other metabolites leaked from the roots), decomposing soil fungi generally can break down tougher sources like cellulose and lignin. Organic matter is a primary driver of soil productivity and is the foundation of functional soil biology. As goes soil organic matter, so goes the soil.

2 NUTRIENT CYCLING.

Soil biology is a primary driver of nutrient cycling in our soils. Soil bacteria utilize active carbon, the fraction directly available for use by microbes. Much of this active carbon begins as plant exudates. These exudates excreted from plant roots are a primary food source and are utilized by soil bacteria directly along the plant roots. As the bacteria die, they mineralize and release nitrogen contained in their bodies, thus cycling nutrients.

The microbes themselves constitute a considerable amount of nutrient cycling in their own biomass. The microbial biomass or the amount of microbes a soil sustains can be 2 to 5 percent of the total organic matter in a soil. However, this fraction is self-motivated and living. This fraction also contains considerable amounts of essential plant nutrients. Biologically significant amounts of nitrogen, sulphur and phosphorus are mineralized into plant available forms and released for uptake when microbes expire.

Protozoa also play a key role in nutrient cycling by just doing what they do. Protozoa are predators. They feed on soil bacteria. Soil bacteria have a carbon-to-nitrogen ratio of about 5:1 while protozoa have a ratio closer to 10:1. As the protozoa feed on the bacteria, they consume more nitrogen than they need. The excess is excreted and utilized by plants, and the cycling process continues.

As the bacteria die, they mineralize and release nitrogen contained in their bodies, thus cycling nutrients.

3 SOIL AGGREGATION.

Soil aggregation refers to a soil's ability to hold particles together. Soil biology aids in this process by simply decomposing organic material and developing organic matter. As organic matter increases in soil, the ability to form soil aggregates increases. Soil fungi aid in this process by helping the soil physically hold particles together. Arbuscular mycorrhizal fungi coat their hyphae with a compound called glomalin. Glomalin serves as a protective coating to prevent nutrient and water loss as they are transported to the plant. Glomalin also serves as a soil glue and helps stabilize soil aggregates. These processes, along with many others, improve soil structure and helps soil resist disruptions like wind and water.



The presence of earthworms is an indicator of soil health. Earthworms help improve water dynamics in the soil by burrowing through the earth, creating tunnels for water and roots to travel.

4 NUTRIENT AVAILABILITY.

Nutrient availability is also positively impacted by microbial activity. Soil fungi plays a large role. Soil fungi form long strands called hyphae. These hyphae extend through the soil between soil aggregates, particles and rocks. Mycorrhizal fungi form mutualistic relationships with plants. Mycorrhizal fungi utilize carbon from plant roots. In exchange, the fungi helps solubilize phosphorus and other nutrients, making them available for plant use. This process essentially extends the reach of plant roots, increasing their ability to tap nutrients.

Some soil bacteria form symbiotic relationships with plants to increase nutrient availability. Rhizobium bacteria infect the root hairs of specific legume species. In exchange for carbon, this bacteria fixes atmospheric nitrogen. This nitrogen is available for the plant itself to use. However, once the plant dies, the excess nitrogen is released and available for subsequent plant use.

5 WATER DYNAMICS.

Through the processes outlined above, soil biology ultimately aids in soil water dynamics such as infiltration and water holding capacity. As organic matter increases, soil aggregation follows. As soils aggregate their particles, the pore space and porosity increases. Earthworms also aid in this process by burrowing through the soil, creating tunnels for water and roots to travel.

As pore space increases, the amount of water that can effectively infiltrate into the soil profile generally increases. The goal is to get the water in the ground and to minimize run off. Soil biology aids in that process. A soil's available water holding capacity is also aided by soil biology. Organic matter is very efficient at holding water. As biologically active soils increase organic matter, their capacity to hold water can increase. This process tends to be more effective on coarser soils. Clay substrate soils may have a lesser impact as the clay itself is the driver for its capacity to hold water. 🐌

IN THIS ISSUE

Cover Crops	1
Harsh Weather Technologies	3
Calving Season	5
Legalities of Protected Seed	7
Pecan Pest Management Plan	9
Soil Biology	11



APRIL 18

Controlling Pests in Pecan Orchards

**9 a.m.-noon
Noble Research Institute
Kruse Auditorium
Entry 5; No Registration Fee**

When managing pests in the pecan orchard, it is imperative that you can identify the major animal, disease and insect pests and understand how they relate to pecan development stages. Join us to learn how to identify pests and to discover a variety of practices used to prevent and treat them.

Contents ©2019, Noble Research Institute, LLC
Noble News and Views is published monthly by the Noble Research Institute. Current and past editions of *Noble News and Views* are available at www.noble.org/news-and-views.

Free subscriptions delivered by email are available at www.noble.org/subscriptions. The Noble Research Institute encourages the republication of *Noble News and Views* articles. For publication guidelines, contact J. Adam Calaway, director of communications and public relations, at jacalaway@noble.org. High quality electronic versions of photos and graphics are available.

UPCOMING EVENTS

For more information or to register, visit 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.



MARCH | 26
Planting Vegetable and Fruit Crops

This event will showcase the various tools and techniques used in seeding and transplanting vegetable crops. You will also see a demonstration of the proper way to plant small fruit and tree fruit. This course is intended for backyard and commercial-scale plantings.

**1-4 p.m.
Small-Scale Ag Demo Area, Entry 2
No Registration Fee**



MARCH | 27

Demonstrating Soil Health Principles and Practices
**1:30-5 p.m.
Protected Ag Demo Area, Entry 2
No Registration Fee**



APRIL | 2

Managing Fruit Crops
**6:30-8:30 p.m.
Kruse Auditorium, Entry 5
No Registration Fee**



APRIL | 4

Demonstrating Pecan Orchard Floor Management
**1-4 p.m.
Kruse Auditorium, Entry 5
No Registration Fee**



APRIL | 16

Managing Vegetable Crops
**6:30-8:30 p.m.
Kruse Auditorium, Entry 5
No Registration Fee**