JUNE 2018 | VOLUME 36 | ISSUE 6 A MONTHLY PUBLICATION FROM THE NOBLE RESEARCH INSTITUTE


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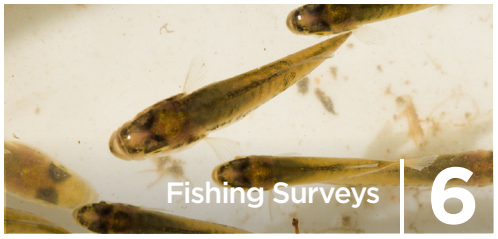
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NOBLE NEWS & VIEWS

ECONOMICS

New Cattle Market Web Tools Now Available

By Jason Bradley, agriculture economics consultant | jwbradley@noble.org

Producers can now easily access Oklahoma cattle auction data using two web-based tools created by the Noble Research Institute's economics consultants and computing services team.

We've taken the U.S. Department of Agriculture Agricultural Marketing Service (USDA-AMS) market reports from the seven reporting livestock auctions in Oklahoma (Ada, Apache, El Reno, McAlester, Oklahoma National, Tulsa and Woodward), as well as the Oklahoma combined average, sorted through the numbers and put them back together in a way that makes it easy for producers to see the current market conditions.

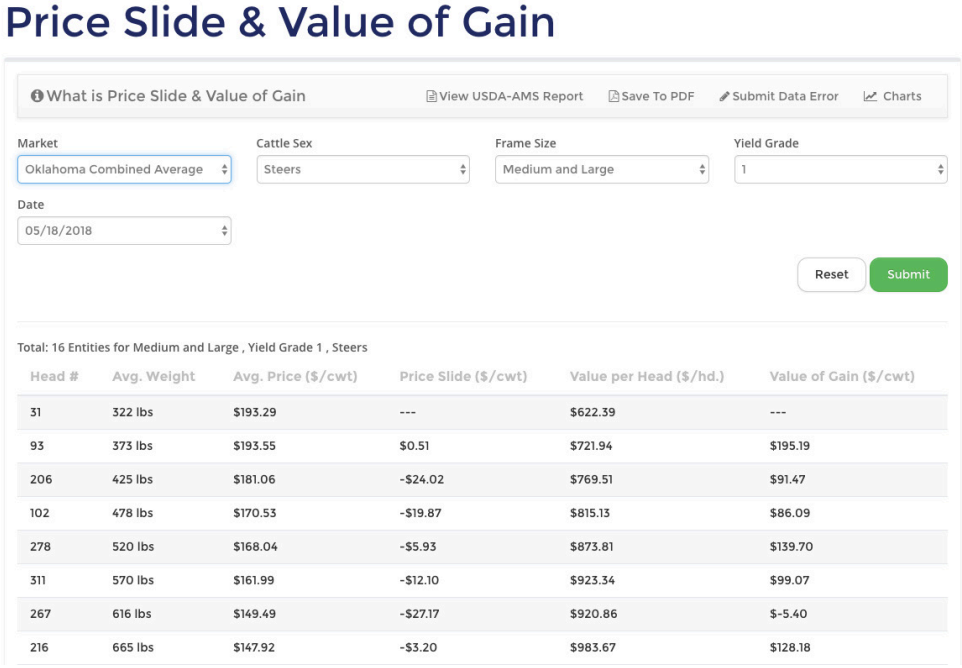
Information is updated every evening in order to stay as up-to-date as possible. This dataset also provides producers the ability to look at historical conditions for these markets. All the information provided by these web tools are available publicly.

Continued on next page

TOOL 1: PRICE SLIDE TABLE

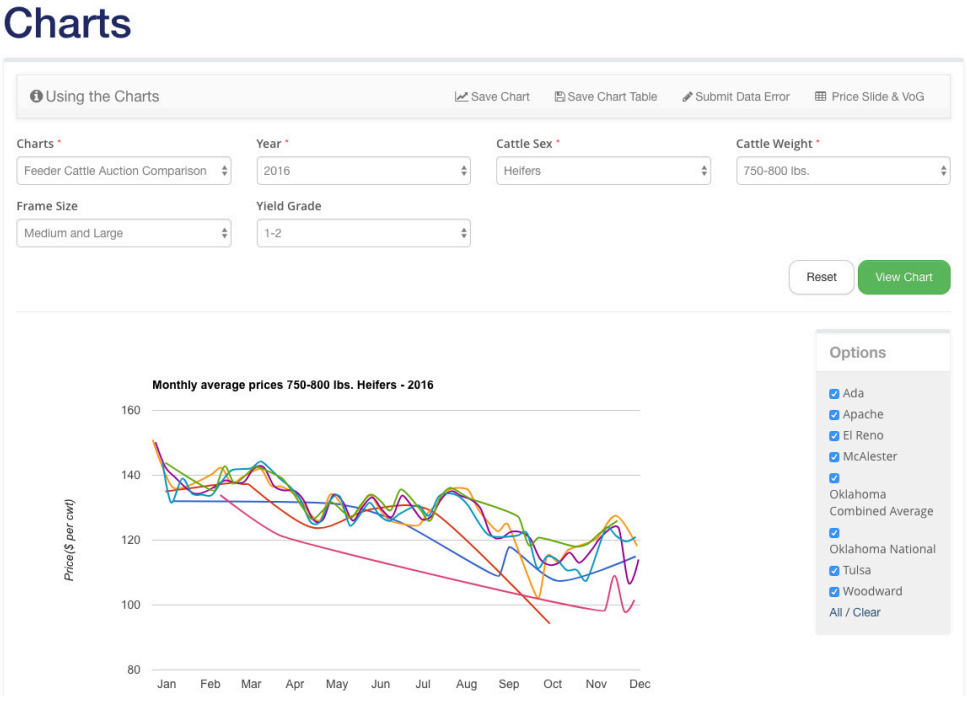
The first web tool is a breakdown of the price slide (PS) and value of gain (VOG) for any of the reported markets. The PS and VOG page looks at the sales receipts for the selected market, gender, frame size, yield grade and the sale date to provide a look at what type of cattle buyers are wanting. Cattle that have notes (e.g., calves, thin, fleshy) are not included in the table to prevent the PS and VOG from being effected. If a producer wants to see the original USDA-AMS report the data was taken from, a link is provided near the top of the page.

It's important for a producer to understand the concepts behind price slide and value of gain. As an animal grows, the price paid on a per pound basis usually decreases. This decrease is known as the price slide. In a normal market, even though the price per pound decreases, the total value of the animal increases. This change in the value per head divided by the change in weight is the value of gain. Producers compare VOG with the cost of gain (COG), which is the cost for the animal to gain one pound of weight. If the COG is less than the VOG, it is profitable for the producer to grow the animal to a larger size. However, if the COG is higher than the VOG the producer would lose money growing the animal.



Head #	Avg. Weight	Avg. Price ($/cwt)	Price Slide ($/cwt)	Value per Head ($/hd.)	Value of Gain ($/cwt)
31	322 lbs	$193.29	---	$622.39	---
93	373 lbs	$193.55	$0.51	$721.94	$195.19
206	425 lbs	$181.06	-$24.02	$769.51	$91.47
102	478 lbs	$170.53	-$19.87	$815.13	$86.09
278	520 lbs	$168.04	-$5.93	$873.81	$139.70
311	570 lbs	$161.99	-$12.10	$923.34	$99.07
267	616 lbs	$149.49	-$27.17	$920.86	$-5.40
216	665 lbs	$147.92	-$3.20	$983.67	$128.18

FIND THE CATTLE MARKET DATA TOOLS AT NOBLE.ORG/AG/SERVICES



TOOL 2: MARKET CHARTS

The second web tool is a set of charts for feeder, slaughter and replacement cattle. There is an option to compare each group across the selected reported markets during a specific year or across years. The auction comparison tool is designed to provide producers with information to help them in their marketing and purchasing options. The year comparison allows producers to evaluate a particular market over multiple years and see how the current year is stacking up against previous years.

Each cattle type has different ways to refine the results. Feeder cattle are selected by gender and weight, with the option for frame size and yield grade. If left blank, the chart will automatically include all frame sizes and yield grades. Slaughter cows are broken down by their class (e.g., lean, light) and dressing levels. Replacement cattle have the option of being sorted by bred cattle or by pairs. Other characteristics are available to be used to refine results, but, again, if left blank the chart will automatically include everything in the results. One of the great features of this web tool is the interactive chart. Producers have the option of what years or markets to include, depending on the chart they are looking at. They also have the ability to select a particular sale date on the chart and view the original USDA-AMS report.

TELL US WHAT YOU THINK

This is just the beginning. Working toward providing producers with the tools and information that can be used to make timely management decisions, like determining when to buy or sell cattle, is one of the great things we do here at Noble. This opens the door to so many more things we can start to do. I'm excited to see what kind of response these web tools get from the producers we work with and to find out what they'd like to see next.

ECONOMICS

Economics of No-Tilling Cereal Rye Pastures

By Jon T. Biermacher, Ph.D., senior economist | jtbiermacher@noble.org
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The economics of no-till versus clean-till establishment of a winter small grain crops (e.g., wheat, rye, oats) in the Southern Great Plains has been evaluated extensively using grain data collected from small plot agronomic studies at experiment stations throughout the region. However, little attention has been given to the relative economics of no-till versus clean-till establishment of small grain pasture used solely for growing beef cattle.

Between 2 and 3 million acres of small grain pasture is established using clean-till establishment methods (i.e., some combination of plowing, discing, cultivating and planting with a conventional small-grain drill) each year in the Southern Great Plains. Production expenses associated with clean-till methods are steadily increasing, especially for fuel and owner's labor for the field operations (tillage, cultivation, planting) used to establish small grain pasture. In addition, there are increasing environmental concerns associated with continuous, annual clean-till establishment of small grain pasture on these acres, including an overall loss of soil health and soil carbon, nitrogen leaching into watersheds, and soil erosion.

Despite the lack of economic information, production scientists, environmental groups and beef consumers have been advocating and promoting no-till establishment practices to farmers and ranchers in the Southern Great Plains. In response to these concerns, the Noble Research Institute conducted an on-farm research study to compare the production and economics of clean-till and no-till methods for establishing cereal rye pasture for grazing.

GRAZING STUDY

Animal performance data representing beginning and ending body weights and dates, average daily gain (ADG), stocking rate, and steer grazing days were collected from a four-year (2010-2014) stocker cattle grazing trial in south-central Oklahoma. The grazing trial was set up as a completely randomized design with five, 10-acre replicates of the two establishment methods, clean-till and no-till. In each study year, a set of mostly black-hided sale-barn cattle (four-year average body weight = 450 ± 103 pounds) typical for the region were purchased on or near Oct. 1 and preconditioned for at least 45 days prior to grazing initiation. Enterprise budgeting techniques were used to calculate expected revenue; variable and fixed costs; and net return to land, management and overhead for each establishment system, assuming

TABLE 1. FOUR-YEAR POOLED AVERAGE ANIMAL AND ECONOMIC PERFORMANCE MEASURES BY FORAGE ESTABLISHMENT SYSTEM

Measures of animal and economic performance:	Clean-Till	No-Till	Difference	P-value	%Change
ANIMAL					
Placement date	Nov. 16	Dec. 3	17.0	-	
Placement weight (pounds per acre)	498.71	521.39	22.7	0.0028	
Termination date	April 25	May 3	8.0	-	
Termination weight (pounds per acre)	878.4	888.03	9.6	0.3828	
Average daily gain (pounds per head per day)	2.44	2.50	0.1	0.1831	
Steer grazing days	188.5	177.9	-10.7	<.0001	
Total gain (pounds per acre)	463.4	449.4	-14.1	<.0001	
ECONOMIC					
Seed cost (price per acre)	$30	$30	$0	-	
Fertilizer (N, P, K and lime) and fertilizer application costs (price per acre)*	$93.1	$93.10	$0	-	
Herbicide (2,4-D) and herbicide application costs to control broadleaf weeds (price per acre)	$11.50	$11.50	$0.00	-	
Insecticide (carbaryl) and insecticide application to control armyworm (price per acre)**	$3.50	$3.50	$0.00	-	
Herbicide (glyphosate) to burn back annual grasses and weeds (price per acre)	$0	$8.60	$8.60	-	
Machinery labor costs (price per acre)	$10.80	$4.50	$-6.30	-	-58.3%
Fuel, lube and repair costs (price per acre)	$23	$9.60	$-13.40	-	-58.3%
Opportunity cost of operating capital at 5.5 APR (price per acre)	$4.20	$3.70	$-0.50	-	-12%
Steer ownership capital at 5.5 APR (price per acre)	$25	$23.80	$-1.20	<.0001	-4.6%
Total variable cost (price per acre)	$201.10	$188.30	$-12.80	<.0001	-6.3%
Value of gain (price per pound)	$0.80	$0.80	$0.00	-	0%
Gross revenue (price per acre)	$370.74	$359.48	$-11.30	<.0001	-3%
Gross margin (price per acre)	$169.70	$171.10	$1.40	0.8391	0.8%
Fixed costs for establishment machinery (price per acre)***	$27.80	$11.60	$-16.20	-	-58.3%
Variable plus fixed costs (price per acre)	$228.90	$199.90	$-29	<.0001	-12.7%
Net return to land, management and overhead (price per acre)	$141.90	$159.50	$17.60	<.0001	12.4%

* 80 lbs/ac of N (46-0-0), 60 lbs/ac of P205, 60 lbs/ac of K20, and 0.34 ton/ac of lime (100% ECCE) were applied each year during establishment.

** It was assumed that control for armyworm was only needed every other year.

***Published custom rates were used for all establishment activities (http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-6752/CR-205%202017-2018web.pdf). Based on estimates from the Oklahoma Cooperative Extension Service (OCES) for a 500-acre farm, 17.6%, 37.3%, and 45.1% of the rate for each custom establishment operation were for machine labor; fuel, lube and repairs; and fixed cost for depreciation, interest, taxes, insurance and shelter.

a 500-acre farm size. Analysis of variance was used to determine the presence of statistically significant differences in measures of animal and economic performance between the two methods.

ANIMAL AND ECONOMIC PERFORMANCE

Measures of animal and economic performance are reported in Table 1. Due to an average delay of 17 days in the placement of steers on the no-till pastures, the average placement weight differed by 22.7 pounds per head. Even though steers were placed on clean-till pastures before no-till pastures, grazing on clean-till pastures was terminated on average eight days before no-till pastures. As a result, the average termination weight between systems was not statistically different. ADG for clean-till and no-till systems (2.44 versus 2.50 pounds per head per day) was not different, but the clean-till system had 10.7 more grazing days. Using grazing days and ADG measured in the study, the clean-till system realized 14 more total pounds of gain per acre (463 pounds per acre versus 449 pounds per acre) than the no-till establishment system.

RELATIVE COST

Even though total gain favored the clean-till system, the relative cost of production between the two systems was a much different story. Costs for seed, fertilizers, and broadleaf weed and insect (armyworm) control were the same for both systems. However, costs associated with establishment of pasture were lower with the no-till system. Specifically, the variable costs associated with labor as well as fuel, lubrication and repairs for tractors and equipment used to establish pasture were collectively $19.70 per acre lower for the no-till system than for clean-till. Labor savings alone was equal to $6.30 per acre, which, at $10 per hour, is equivalent to a savings of 37.8 minutes per acre. For a 500-acre farm, this equals a savings of 39.4 eight-hour days of labor compared to the clean-till system. Also, fixed costs associated with capital recovery (depreciation and interest) as well as taxes, insurance and shelter for the establishment equipment for the no-till system were $16.20 per acre lower than those for the clean-till system. The use of glyphosate to chemically burn back weeds and annual grasses prior to the no-till establishment of cereal rye seed was $8.60 per acre, but the total cost difference between no-till and clean till was $29 per acre in favor of the no-till system.

NET RETURN

In our base-case scenario, it was assumed that each pound of gain produced by cattle in each system was worth 80 cents. Based on this assumption, the net return between the two systems favored no-till by $17.60 per acre. The difference in net returns between the two systems was most sensitive to assumptions about value of gain (VOG). A reduction in the base-case

VOG from 80 cents to 50 cents eroded net return of the clean-till system down to $0 per acre and widened the net value per acre of no-till from $17.70 to $21.87. Conversely, we found that a VOG of $2.05 was required to erode the difference in net return between the two systems down to $0 per acre (i.e., at a VOG of $2.05, net return for both systems was equal to $718.30 per acre).

PAYBACK PERIOD OF NO-TILL DRILL

We anticipated that many producers would be interested in knowing what the payback period would be for the purchase of a new no-till drill. Our estimates for fixed costs for the no-till establishment system evaluated in this study assumes the purchase of a new 15-foot no-till drill at a price of $50,000. Based on our assumption of the 500-acre farm and a base-case expected net return of $17.60 per acre, the payback period would be 5.65 years.

CONCLUDING THOUGHTS

The results from this study provides some economic evidence and support for the adoption of the environment-friendly and labor-friendly no-till system to establish small grain pasture for growing beef cattle in the Southern Great Plains. Because no-till practices are quite different from traditional clean-till methods and requires liquid applications of glyphosate and the use of a no-till drill or air seeder, we expect that producers will realize challenges as they adopt the system. In fact, producers who have successfully adopted no-tilling in the region report that it took, on average, three production seasons to fully learn and implement the no-till system. However, those who have learned the ways of no-tilling tell us they will never return back to a conventional tillage program.

At the Noble Research Institute, we recommend that producers who are interested in switching to a no-till system for their small grain pastures start by working with an agricultural soils and crop consultant, extension forage specialist, or experienced no-till farmers in their farming community.

SOILS

Stockpiled Summer Annual Forages as a Replacement for Fall Wheat Pasture

By Jim Johnson, soils and crops consultant | jpjohnson@noble.org

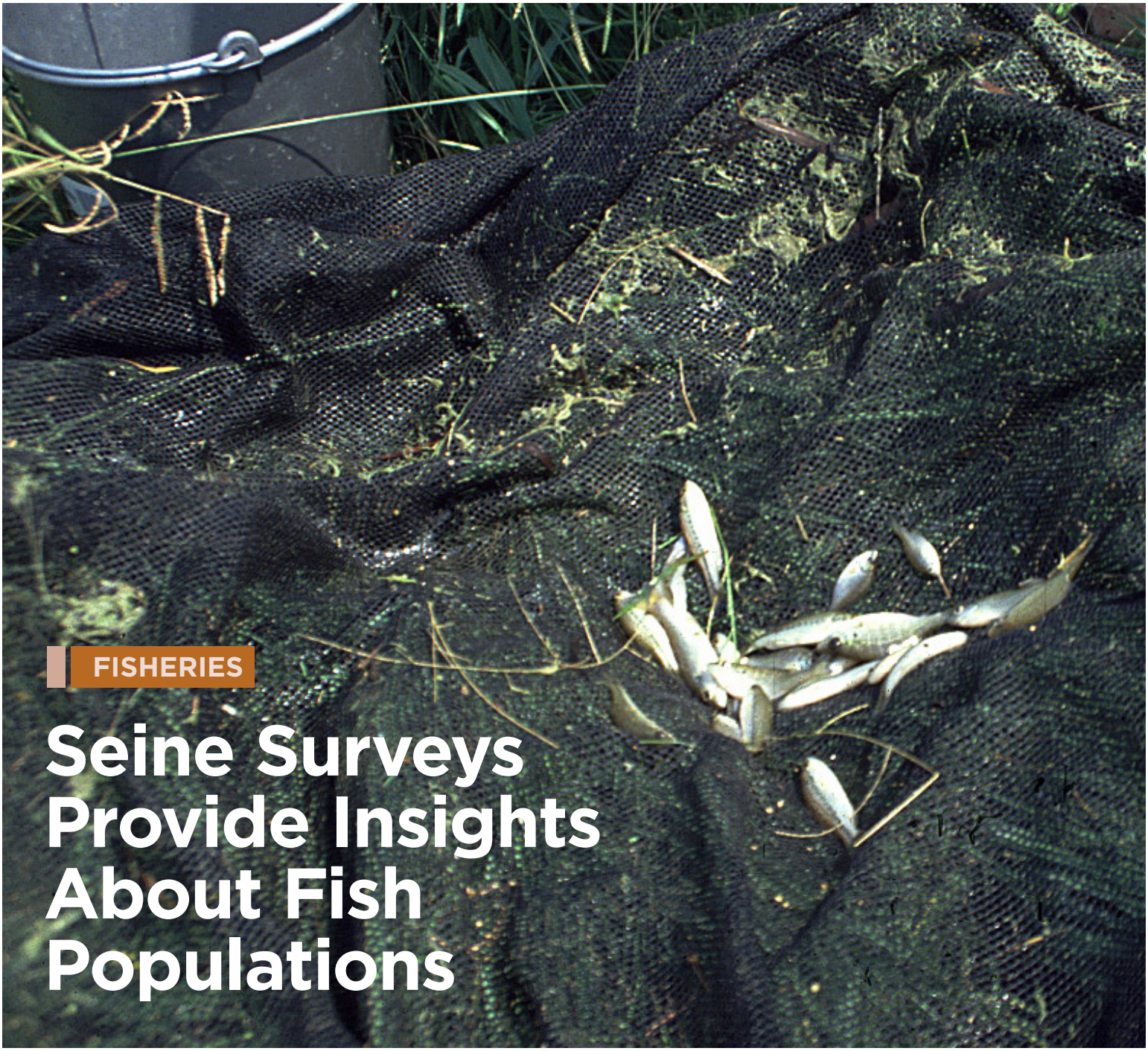
Millions of cropland acres in the Southern Great Plains are planted to dual-purpose or graze-out wheat and other cool-season annuals each year. Forage production on these acres can range from a few hundred pounds of dry matter per acre, like we experienced during the winter drought of 2017-2018, to about 10,000 pounds of dry matter per acre. However, 4,000 to 6,000 pounds of forage dry matter per acre is probably more typical of small grains in Oklahoma and surrounding areas.

What if a portion of that forage could be replaced with something other than wheat in the fall? Is wheat what we should be growing for fall forage? I asked similar questions in an article titled “Changing it up” in the March 2018 issue of Hay & Forage Grower. Some farmers have figured out some possible answers to these questions.

Cover crops – in this case more appropriately called multi-species grazing crops – can be planted in the summer and grazed in the fall or stockpiled to provide forage after the first frost. One farmer planted a mix of warm- and cool-season annuals on Aug. 24, 2017. His mix included mungbeans, guar, lentils, sorghum, pearl millet, browntop millet, corn, triticale, turnips, radishes, collards and sunflowers. By Oct. 26, 2017, he had just over 6,000 pounds of forage dry matter per acre. This farmer had moisture to plant into in late August but felt it was still too early to plant wheat. He had an opportunity and took advantage of it. This field produced more forage and grazing per acre than any of his wheat fields.

The same year, other farmers in the area had planted “cover crops” earlier in the summer. Because of favorable growing conditions, many of them had produced 10,000-plus pounds of forage dry matter per acre that they needed to deal with before they could plant wheat that fall. Some chose to graze those cover crops. Others chose to terminate them and plant wheat. The ones who planted wheat destroyed more forage than they will likely grow with wheat in two years.

I’m not against wheat. However, I think there are opportunities to increase production of some different annual forages on a portion of the acres normally planted to wheat. These cover crops, or multi-species grazing crops, will need to be managed differently than wheat. But considering the variability and unpredictability of the weather, they are another fall forage source that is worth considering.



FISHERIES

Seine Surveys Provide Insights About Fish Populations

By Mike Porter, wildlife and fisheries consultant | mdporter@noble.org

A seine survey is a relatively easy way to learn about fish populations in impoundments and streams and to help improve management decisions. Seining is one of several fish survey techniques, which also include hook and line fishing, electrofishing, scuba diving/snorkeling, cast netting, gillnetting, hoop netting, fyke trap netting or fish

Information about hook and line fish surveys, and fish trap surveys are available at www.noble.org/hook-line-sampling and www.noble.org/funnel-trap-survey respectively.

trapping.

Seine design and the method used in surveys should remain consistent across years and ponds so changes in animal species and abundances captured represent population changes rather than changes in survey technique.

SEINE DESIGN

Seines are available in different lengths, heights and mesh sizes, and they can have different-sized floats and weights. Also, a seine can have extra material in the middle that forms a bag, which improves capture and retention of aquatic organisms.

In my opinion, a 20-foot-long seine that is 4 to 6 feet tall is a good size for surveying small impoundments. I prefer 1/8-inch mesh for pond surveys so the seine can capture many fish fry and insects. However, a seine with 1/4-inch mesh can be used as long as the data interpreter realizes many fish fry and insects pass through the mesh.

A pole somewhat longer than seine height should be attached to each end to provide support and make it easier to move the seine through the water. The pole bottom should be pushed along the pond bottom ahead of a person moving the seine to keep the weighted line from lifting off the bottom.

SURVEY METHOD

Common seine survey methods include quadrant survey and drag survey. In a quadrant survey, a person pulls the seine into the water perpendicular to the shore, while another person follows and stops the seine at water's edge. The person in the water pulls the seine in an arc to shore while keeping it tight; this motion forms a quadrant of a circle. If the shoreline is smooth and has a gradual slope, both people can drag the seine out of the water while keeping the weighted line on the bottom. If the shoreline has much slope or vegetation, one or both people should move the poles together while keeping the weighted line on the bottom. Then one person holds the poles as the other person pulls the weighted line out of the pond while keeping it on the bottom.

In a drag survey, both people pull the seine through the water for a distance and then remove the seine from the water using one of the aforementioned techniques or the lift technique. With the lift technique, the seine is pulled tight while the weighted line is quickly and smoothly lifted out of the water in a single fluid movement by turning and lifting the poles.

Multiple seine samples should be collected from each pond because different habitats and locations commonly have different animal communities. For ponds larger than 1 acre, I recommend collecting at least four samples per pond. However, when most samples from a pond capture different animal species, I recommend collecting additional samples until no new species are captured.

Seine locations should be devoid of rocks, stumps, sticks, wire, posts and drop-offs. Seine locations should have minimal aquatic vegetation and should have water depths shallower than seine height at the deep end of the seine.

INTERPRETING SURVEY INFORMATION

Seine surveys provide insights about a pond's aquatic ecology, but there are biases and limitations, as with all fish survey techniques. Understanding these biases and limitations is important to properly interpret and use survey information.

Any fish, frog, salamander, crayfish, insect, shrimp, leech or snail species captured confirms the presence of the species in the pond. However, one or more fish species not collected with a seine might be present. Twenty-foot-long seines do a poor job of collecting catfish species and most fish longer than 3 inches, so the numbers caught typically are not representative of their populations.

Seining is a good technique for monitoring sunfish and minnow reproduction in ponds. Seine surveys conducted during summer should capture bluegill, green sunfish, largemouth bass, and minnow fry or fingerlings every year where such species have healthy populations.

Invertebrate, amphibian and small fish species captured or not seen in seine samples can provide additional insight about a fishery. When dozens of aquatic insects or more than one leech are captured in most seine samples, sunfish and catfish probably are absent or scarce. Dozens of crayfish, tadpoles, salamanders, mosquito fish or small minnows captured in several seine samples indicates few or no largemouth bass are present.

Seine surveys, especially when combined with other techniques such as hook and line surveys, provide helpful information for pond management decisions. Seine surveys are rarely necessary in a pond every year, but periodic surveys helps monitor fish and other aquatic animal community changes over time. Maintaining records of animal species, sizes and numbers captured during seine surveys helps document these changes. Seining can be enjoyable and provide a legitimate excuse to catch fist in the name of scientific pond management.

FIGURE ONE

Quadrant seine survey

In a quadrant survey, a person pulls the seine into the water perpendicular to the shore, while another person follows and stops the seine at water's edge. The person in the water pulls the seine in an arc to shore while keeping it tight.

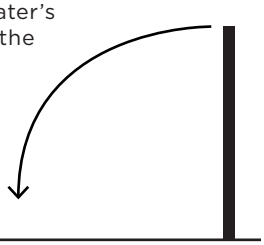
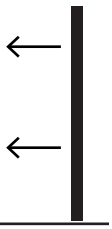


FIGURE TWO

Drag seine survey

In a drag survey, both people pull the seine through the water for a distance and then remove the seine from the water using one of the aforementioned techniques or the lift technique. With the lift technique, the seine is pulled tight while the weighted line is quickly and smoothly lifted out of the water in a single fluid movement by turning and lifting the poles.



RESEARCH

Why Roots Matter to Soil, Plants and You

By Larry York, Ph.D., assistant professor | lmyork@noble.org

Imagine walking out into a crop field or pasture. What do you notice? Perhaps you see amber waves of grain out to the horizon or hear the leaves rustling in a cool breeze. But would you ever think about what's beneath your feet? What lurks in that hidden world, and why does it matter to you?

As you look at all the growth aboveground, you might consider that just as much plant mass is invested in roots. In fact, in the springtime in Oklahoma, 1 acre of grassland or pasture may have about 1,000 pounds of standing shoot mass aboveground but as much as 3,500 pounds of roots below ground, in the top foot of soil.

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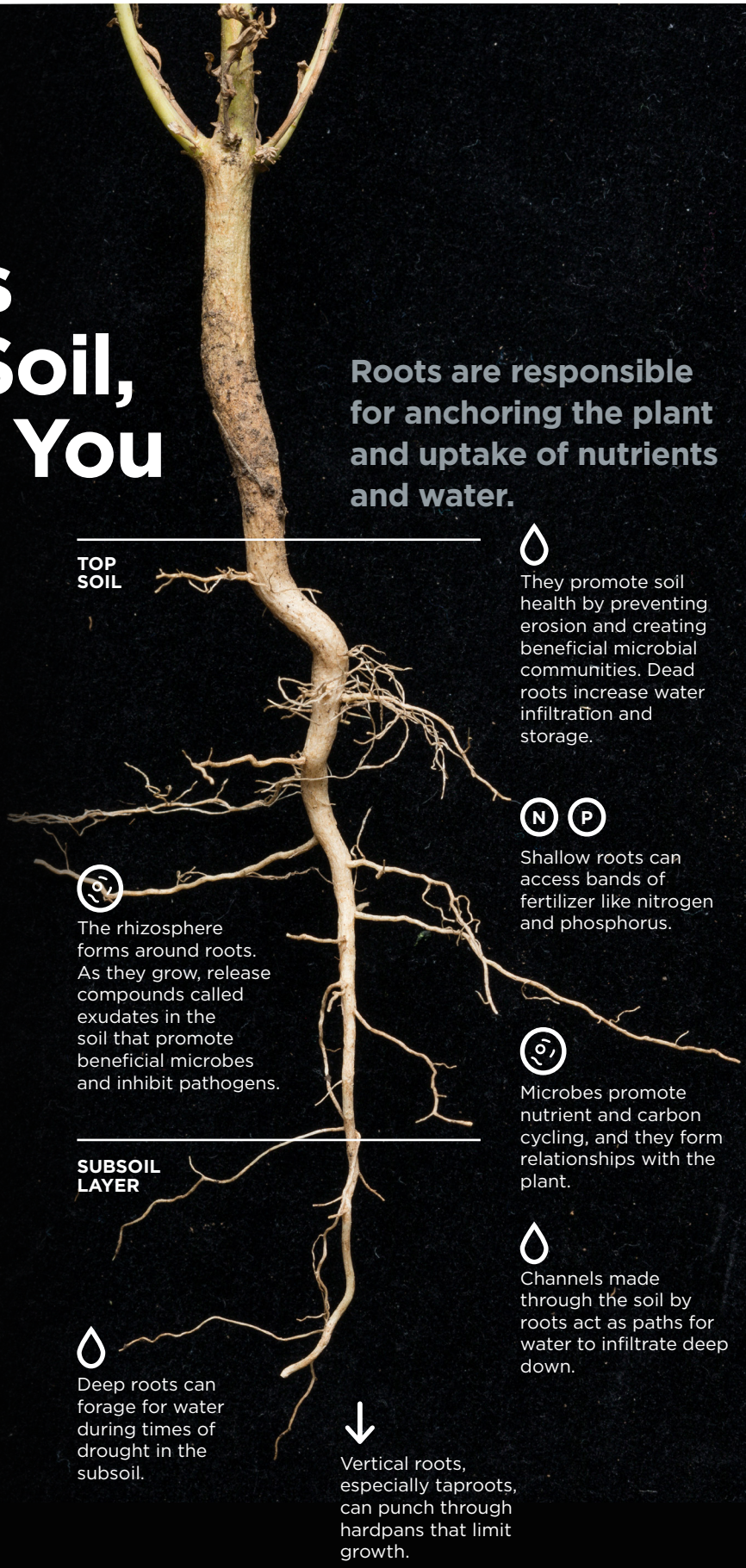
Designing better roots is an important avenue for helping people. With better roots, we can increase yield, reduce fertilizer use and pollution, and promote soil health.

Roots are responsible for anchoring the plant and uptake of nutrients and water.



ROOTS' ROLE

Plants are like a factory, using energy from sunlight to produce sugar in their leaves that provides the carbon backbones for making all the other molecules required for life. In order to build more leaves with their green chlorophyll, plants need to send their roots out into the soil to forage for water and mineral nutrients such as nitrogen and phosphorus. These nutrients are required for making proteins, like chlorophyll, and to fuel the molecular energy system in the form of adenosine triphosphate (ATP). Also, DNA itself requires phosphorus. Once a new leaf is built, water from the soil is taken up by the roots and eventually evaporates from the leaves. Essentially, the whole plant is acting like a straw, with the tips of the roots taking up water from the soil.

IMPROVED ROOT DESIGN

When pondering how to optimize root systems, we have to think carefully. More roots are not always better. Roots are built from the carbon gained during photosynthesis, meaning they represent a construction cost. All those roots also require carbon for normal operations such as respiration, which is the maintenance cost. Therefore, optimizing root systems requires both engineering and economic principles about how to efficiently explore soil with as few roots as possible. In fact, many human factories use this marginal value theorem from economics to decide which parts of the factory to invest in, always maximizing the investment's profit per unit cost.

In basic research and breeding programs at the Noble Research Institute, we consider aspects of root system architecture including root angles, number of axial roots, lateral root branching density and root diameters. We use image-based plant measurement, or phenotyping, among many other approaches.

BENEFITS OF BETTER ROOTS

However, roots don't matter only to the plant. In fact, roots are central to soil health, which ultimately relies on the photosynthetic abilities of plants to provide food to the entire ecosystem. As roots explore, they release sugars, organic acids and other compounds into the soil during the exudation process. Through this process and others, soil around the roots becomes a special place called the rhizosphere (rhizo means root in Greek). These organic compounds can promote beneficial soil microbes, such as bacteria and fungi, and inhibit plant pathogens. Beneficial soil microbes increase carbon and nutrient cycling in the soil, ultimately benefiting plants.

As roots die, the entire organ becomes dinner for the microbial community along with other soil creatures like worms and insects. All these root-derived inputs are fundamental to creating and storing soil carbon and are a driving force for soil health, as increased soil carbon allows for better water infiltration and storage in pastures and fields.

Designing better roots is an important avenue for helping people. With better roots, we can increase yield, reduce fertilizer use and pollution, and promote soil health. At the Noble Research Institute, we are screening natural diversity for root traits in several crop and pasture species; with the creation of new knowledge, we will include these traits in breeding programs to release new cultivars with improved root systems.

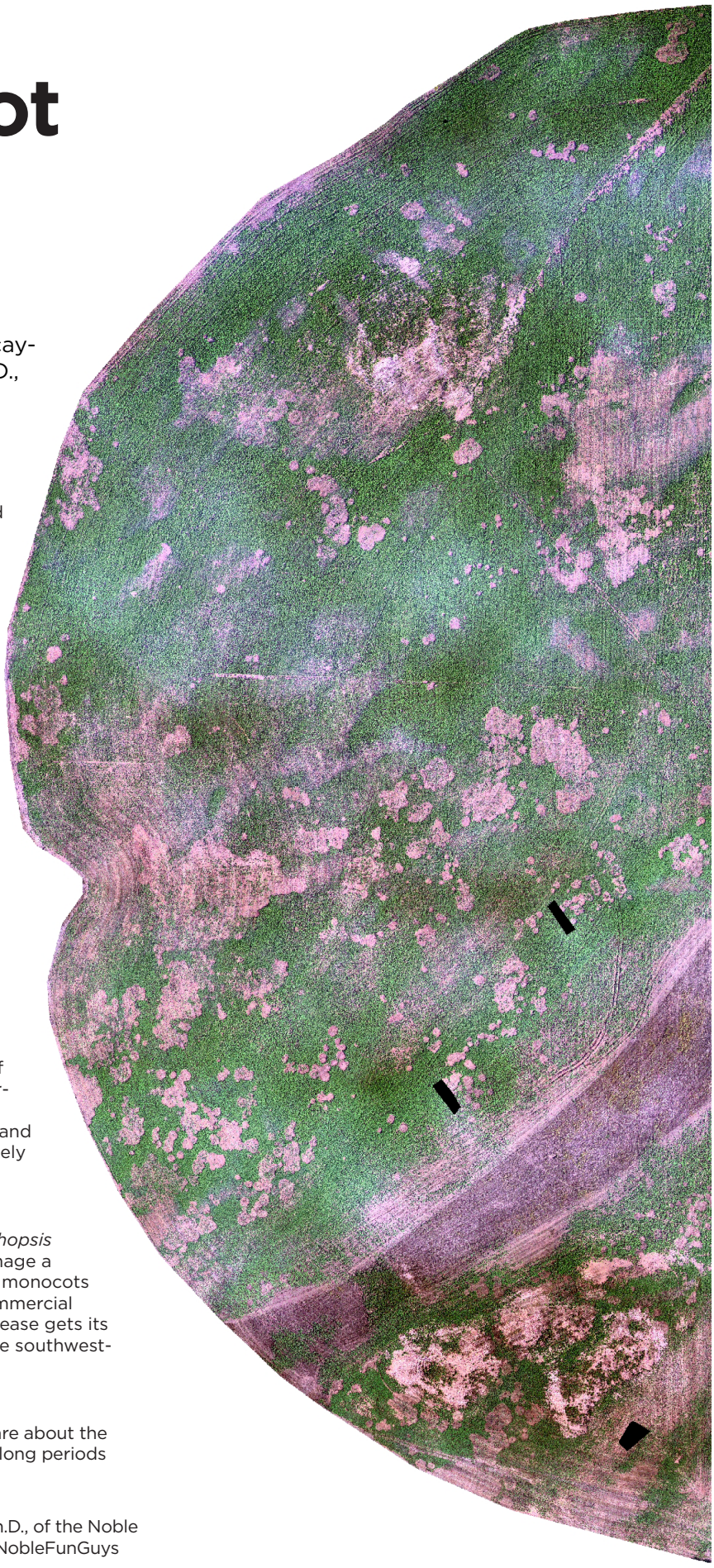
So, the next time you're outside admiring the beauty aboveground, don't forget there is an equally beautiful and complex world under your feet.

RESEARCH

Stalking a Root Rot Disease From the Sky

By Carolyn Young, Ph.D., associate professor | cayoung@noble.org and Chakradhar Mattupalli, Ph.D., postdoctoral fellow | cmattupalli@noble.org

Drones are making it big in the agricultural market with a wide range of applications, from assessing irrigation systems and estimating crop biomass to identifying nutrient and drought stresses in various crop systems. As plant pathologists, we are excited to use drones to better understand the disease progression of one of Oklahoma's most notorious diseases: cotton root rot on alfalfa. Alfalfa is an excellent perennial forage legume crop with high nutritive values, making it an ideal fit in cattle feed rations. However, alfalfa production can be affected by cotton root rot disease, which limits the ability to establish profitable alfalfa stands in areas where this disease is prevalent, such as southern Oklahoma and Texas.



WHAT DOES COTTON ROOT ROT DISEASE LOOK LIKE IN AN ALFALFA FIELD?

Symptoms of the disease are visible during mid- to late summer when diseased plants begin to wilt and then rapidly die. The leaves remain firmly attached to the plant but turn brown, leaving a clear outline of dead plants at the disease front. Wilted plants have rotted roots with outer layers that slough off readily, enabling the root to easily be pulled out of the ground. At the field level, the disease manifests as numerous circular infested areas spreading away from the center, gradually merging and enlarging during the growing season and subsequent years. They resemble fairy rings – but unfortunately not the type you want to see in your field.

WHAT CAUSES COTTON ROOT ROT DISEASE?

Cotton root rot disease is caused by the fungus *Phymatotrichopsis omnivora*. The fungus is soil-borne and has the ability to damage a wide range of dicot (broadleaf) crops such as alfalfa but not monocots such as grasses. The disease is also a serious problem on commercial crops such as pecan and cotton, the crop from which the disease gets its name. Interestingly, cotton root rot disease is restricted to the southwestern United States, usually occurring in basic soils.

HOW LONG CAN THE FUNGUS PERSIST IN SOIL?

The fungus produces sclerotia, overwintering structures that are about the size of an alfalfa seed, enabling the fungus to survive for very long periods

For more news, stay connected with Carolyn Young, Ph.D., of the Noble Research Institute's mycology laboratory on Twitter @NobleFunGuys

in the soil. Anecdotal information from alfalfa growers suggests this disease starts to appear on 1- to 2-year-old alfalfa stands, even if they had been under native grasses for the past 30 years. In short, it is hard to get rid of the fungus once the field is infested.

HOW DO I MANAGE COTTON ROOT ROT DISEASE?

One management option is crop rotation with monocot (grass) crops. No alfalfa cultivars with resistance to cotton root rot disease are available on the market. Currently, Topguard fungicide, which is being used successfully in cotton, is the best strategy to manage this disease. However, this fungicide is not yet registered for use in alfalfa. Efforts are under way to make it available in coming years.

HOW DO DRONES HELP US STUDY COTTON ROOT ROT DISEASE?

When standing in an alfalfa field, it can be difficult to fully appreciate how severe the disease is, especially across a whole field. So, the ability to capture a series of aerial images that span a large area can help us monitor how the disease progresses during the life span of an alfalfa stand. We are using drones

As plant pathologists, we are excited to use drones to better understand the disease progression of one of Oklahoma's most notorious diseases: cotton root rot on alfalfa.

to acquire high-resolution aerial images that provide the ability to make bird's-eye-view assessments of a large area as well as facilitate effective disease monitoring. In addition, we can generate disease maps (maps of an area that show where the disease has occurred over multiple years) from these images, which can help facilitate management decisions that are timely, economical and eco-friendly.

WHAT DOES DRONE RESEARCH MEAN FOR FUTURE COTTON ROOT ROT DISEASE MANAGEMENT?

Drone-acquired aerial images are helping us understand the emergence of new diseased areas and the progression pace of existing diseased areas within a growing season and across different years. The advantage gained from this information is twofold: We can assess stand loss to make informed management decisions regarding replanting, and we can create buffer zones that account for potential disease spread for precise fungicide applications. As more producers progress toward practicing precision agriculture, drone-acquired aerial images will find a unique place in their disease management toolbox.

NOBLE
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IN THIS ISSUE

SEPT. 4

So You Want to Grow Series: Pecans

6:30-8 p.m.
Kruse Auditorium
No Registration Fee

There is a growing demand for pecans as more people are discovering the many health benefits associated with this native nut. Join us as we review the various production and management practices required for successful pecan production.

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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.

Ponds can provide endless hours of recreation as well as increased value to a property. There are many goals for an impoundment, such as sport fishing, waterfowl, livestock water, swimming, fire suppression supply and irrigation supply.

6-8 p.m.
Noble Research Institute Pavilion
No Registration Fee

Calf Pricing and Marketing Strategies Workshop
9 a.m.-3:30 p.m.
Oswalt Ranch
$25, Includes Lunch

Systems Approach to Pasture Management Workshop
8 a.m.-noon
Pasture Demonstration Farm
No Registration Fee

Growing Season Prescribed Burn Field Day
8:30 a.m.-3:30 p.m.
Coffey Ranch
$25, Includes Lunch

So You Want to Raise Cattle
4-8 p.m.
Noble Research Institute Pavilion
$25, Includes Dinner