THE SAMUEL ROBERTS NOBLE FOUNDATION

AG News and Views

A monthly publication of the Noble Foundation's Agricultural Division

Volume 34 / Number 8 / August 2016

ECONOMICS

Noble Foundation reports expected forage establishment costs

by Jon Biermacher, Ph.D. / jtbiermacher@noble.org; Jason Bradley / jwbradley@noble.org and James Rogers, Ph.D. / jkrogers@noble.org

It is that time of year when producers in the region make preparations to establish winter cereal pasture for stocker cattle to graze over the cool-season months. At the Noble Foundation, we establish several hundred acres of cereal pasture at multiple locations for many stocker cattle grazing research studies. As a result, we feel like it would be valuable for us to report the costs we expect to incur for establishing and maintaining our cereal forage pastures.

Table 1 reports our average expected costs for establishing wheat plus ryegrass cereal forage using no-till and reduced-till establishment systems. We investigate forage, animal and economic performance of alternative stocker cattle grazing trials in an effort to develop systems that work more economically than conventional systems that producers use in the region. In addition, we focus our research efforts on grazeout-only systems. That is, we do not conduct grazing research for dual-purpose (gain and grain) systems. The primary distinction in terms of cost between grazeout and dual-purpose systems is the cost associated with purchasing and planting ryegrass, which accounts to $8.25 per acre (15 pounds of seed at 55 cents per pound) for no-till and reduced-till systems.

Like producers, we have to prepare a budget for expenses we expect to incur for our on-farm grazing trials, including expenses for establishing cereal pasture. It's important to note that, like producers, we too experience variation from year to year in growing conditions and prices, so the numbers for our two systems reflect our historical average growing conditions and our best knowledge about prices for the inputs we use. In addition, in an effort to be transparent, we use custom machinery rates published by the Oklahoma Cooperative Extension Service to reflect costs for various establishment and maintenance practices (i.e., discing, cultivating, drilling seed, spraying herbicides and insecticides, and applying fertilizers).

Soil health is very important to maintain economic productivity. We conduct annual soil sampling on all fields and use the results to obtain ac-

Table 1. Average Expected Costs for Establishing Wheat Plus Ryegrass Pasture Using No-Till and Reduced-Till Systems

				No-till		Reduced-till	
Operating Inputs and production activity	Date	Unit	Price ($/unit)	Quantity (unit/ac.)	Cost ($/ac.)	Quantity (unit/ac.)	Cost ($/ac.)
Glyphosate to clean up summer grass, annual weeds	June	Pt.	2.10	2	4.20	-	-
Custom apply Glyphosate (1st application)		Ac.	5.15	1	5.15	-	-
Glyphosate to clean up summer grass, annual weeds	Aug.	Pt.	2.10	2	4.20	-	-
Custom apply Glyphosate (2nd application)		Ac.	5.15	1	5.15	-	-
Seedbed Preperation and Seed Establishment:	Sept.						
Custom discing (twice)		Ac.	12.00	-	-	2	24.00
Custom cultivation (once)		Ac.	10.82	-	-	1	10.82
Wheat seed		Lb.	0.25	100	25.00	100	25.00
Ryegrass seed		Lb.	0.55	15	8.25	15	8.25
No-till drill wheat and ryegrass seed		Lb.	14.5	1	14.50	-	-
Conventional-drill wheat and ryegrass seed		Ac.	12.55	-	-	1	12.55
Fertlizer and Fertilizer Application:	Sept.						
Nitrogen fertlizer in the form of urea (46-0-0)		Lb.	0.18	175	31.50	175	31.50
Phosphorus in the form of Diammonium Phosphate (18-46-0)		Lb.	0.24	110	26.40	110	26.40
Potassium in the form of Potash (0-0-60)		Lb.	0.18	109	19.62	109	19.62
Custom apply N, P and K		Ac.	4.85	1	4.85	1	4.85
Lime (100% ECCE, 1 ton/acre every third year)		Ton	20.00	0.33	6.60	0.33	6.60
Transport and custom apply lime (every third year)		Ac.	22.93	0.33	7.57	0.33	7.57
Lambda Cyhalothrin to kill armyworm (3 oz. every other year)	Oct.	Oz.	1.3	1.5	1.95	1.5	1.95
Custom apply Lambda-Cyhalothrin (every other year)		Ac.	5.15	0.5	2.58	0.5	2.58
Nitrogen fertlizer in the form of urea (46-0-0)	Feb.	Lbs.	0.18	109	19.62	109	19.62
Custom Apply N (Urea)		Acre	0.35	1	0.35	1	0.35
Lambda Cyhalothrin to kill grasshoppers (3 oz. every other year)	Apr.	Oz.	1.3	1.5	1.95	1.5	1.95
Custom apply Lambda-Cyhalothrin (every other year)		Ac.	5.15	0.5	2.58	0.5	2.58
Total Operating Expenses by Establishment System					192.01		206.18

curate fertilizer needs for the growing season. As a result, our costs for fertilizers (nitrogen, phosphate, potash and lime) reflect long-term average soil test results. Prices for fertilizers are obtained from local input suppliers and are based on quantities of product applied. You can see in Table 1 that we apply 1 ton of lime (100 percent effective calcium carbonate equivalent, or ECCE) per acre every third year. This is also a function of soil health as reflected by soil pH.

Also, like many producers, we have issues with armyworm and grasshoppers but not every year. Our long-term records show we experience insect issues every other year, so we have included costs in our budgets to reflect this issue.

We have purposefully excluded expected revenues with our two budgets because our goal here isn't to compare and make recommendations about which establishment method to use on your farm. Each farm has different crops and acreages as well as different sizes, colors, ages and values of tractors, tillage equipment and seed drills. Provided here is information about how we establish cool-season forage for our stocker cattle trials and how we budget expected costs associated with those establishment activities. Whether you use no-till or reduced-till, we encourage you to soil sample, pay attention to soil nutrient needs and pH levels, and develop budgets that reflect your establishment activities. ■

Preparation promotes successful winter pasture season

by James Rogers, Ph.D. / jkrogers@noble.org

Seems like only a short time ago we were getting ready for the start of the 2015-2016 winter pasture season. Now, we are looking square in the face of the 2016-2017 season. If you have not started preparing for the season, start now with a look at potential weather conditions. According to a U.S. Seasonal Drought Outlook prediction model at this writing for a period that ends Sept. 30, temperatures may be slightly above normal and precipitation near normal. If this holds up, soil temperatures should be warm with moisture available, leading to rapid emergence once we get the seed in the ground.

In order to get the seed in the ground, varieties need to be selected and sourced. I recently combined all Noble Foundation small grain variety trial information from 1966-2012 into one data set. A graph of the average total yield of wheat, oat, rye and triticale varieties is shown in Figure 1.

There is some variation from year to year in the data set indicating yearly differences in environmental conditions; but looking at the trend line, total dry matter increased nearly 2,000 pounds per acre over time. Nitrogen rates have increased over time, accounting for some of the increase seen in yield, but have remained fairly steady since 1970. A big change is in the varieties. Only one variety in the 1967 data set, Elbon rye, appears in the 2012 results, which is certainly a tribute to its longevity. New varieties are released for a reason; they outperform older ones.

If you have planted the same variety for a number of years, take a look at some of the new ones. They offer increased yield, disease tolerance, improvements in seasonal forage distribution and improvements in other traits. Noble Foundation through Oklahoma Genetics Inc. recently released new wheat, triticale, rye and oat varieties that are currently on the market.

Next on the preparation list is a soil test. Soil testing has been around for more than 60 years, but only a little more than half of stocker producers use it. Soil testing helps you get the most out of your crop and can influence variety selection. If a soil test reveals acidic soils, you may wish to select a variety that is more tolerant of acidic soils.

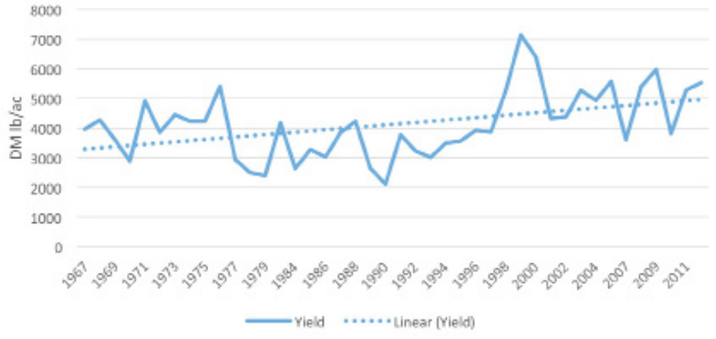
Seedbed preparation is also essential for good seed-to-soil contact and establishment. If you are in no-till production and will be applying a burndown herbicide application prior to planting, follow the recommended rates. Going off label and lowering rates can lead to herbicide resistance in weeds, which eventually creates problems for everyone. Another part of correct application is calibrating the spray rig to make sure it is applying what you think it is. Nozzles wear and rates change over time. If it has been awhile since you have done a thorough inspection and calibration of your spray equipment, winter pasture preparation time is a good time to get that done. Calibration methods can be found at www.noble.org/ag/tools.

Also, inspect planting equipment for blockages and broken parts. I hate to stop for repairs in the field. Doing a good job in the shop prior to planting helps. Calibrate planting equipment. Parts wear and seed size changes. Calibration will help you overcome these changes and ensure you get the right rates in the field.

Finally a word about seed: doing everything right but planting poor quality seed can lead to disastrous results. Be sure your seed has been tested for germination and vigor. Seeding rates can be adjusted for low germination and vigor, but you need to know this prior to planting.

Hopefully, this will turn out to be a successful year for winter pasture with cattle going out early. A little preparation prior to planting can help make it successful. Seed supplies should be very good with the exception of some of the latest varieties, which may be somewhat limited. ■

Figure 1. Average dry matter forage yield of small grains from Noble Foundation variety trials in Ardmore, Oklahoma, from 1967-2012



Raised garden bed design downsized for construction ease

by Steve Upson / sdupson@noble.org

I have received quite a bit of feedback since the release of the Noble Foundation "Easy Access Raised Garden Bed" publication available at www.noble.org/global/ag/horticulture/easy-access-raised-bed/nf-ho-15-01.pdf. For the most part, the feedback has been positive. The one concern I hear most pertains to the weight of the truck tires. Some people are intimidated by the size and weight of the tires, and they question whether they will be able to physically handle the tires during bed construction. While this was not my experience constructing the bed, I can appreciate how some might have second thoughts.

In an effort to make bed construction more user-friendly, I recently constructed a similar type of bed using passenger car/light truck tires. These tires are approximately 8 inches narrower than the truck tires called for in the construction plans and only half the weight. The downside of using smaller tires is that you get a smaller bed. Our "mini" Easy Access Raised Bed is 2 feet shorter and 8 inches narrower than the full-size bed and about one-third less surface area depending on the size of tire used. What you gain in construction ease you lose in growing area. One benefit I overlooked when collecting tires for the mini bed was how easy it is to locate passenger tires. Tire stores catering to the public are seemingly located on every corner. This is not so with commercial truck tire stores.

The same construction techniques can be used to construct any downsized version of the Easy Access Raised Garden Bed. The only difference is the decreased number and size of the building materials.

During construction of our mini bed, I replaced the corrugated metal liner with a geotextile fabric liner manufactured by High Caliper Growing Systems in Oklahoma City. The custom-made "Smart Pot" liner eliminates the need for caulking and foam sealant to seal the ends of the bed. Additional benefits derived from using the fabric liner include moderation of soil temperature attributed to evaporative cooling and increased root mass due to fabric-induced root pruning. Growers who choose to install a fabric liner will need to equip the bed frame with some type of plastic or wire mesh support to prevent sagging when the bed is filled with growing mix. Smart Pot liners for any size of Easy Access Raised Garden Bed can be purchased from High Caliper Growing Systems (www.treebag.com or 800-521-8089). A liner for a full-size Easy Access Raised Garden Bed (10-feet by 40-inches by 13-inches) costs $65, excluding shipping.

Gardeners looking for additional ways to reduce the cost of constructing an Easy Access Raised Garden Bed should consider the use of pallet lumber as a substitute for treated 2-inch by 4-inch lumber. Pallet lumber is typically one-third to one-half the cost of store bought and is available ready-to-use from pallet recycling businesses. The ends of our mini bed are framed with pallet lumber. While not as uniform in shape as store-bought lumber, pallet lumber is adequate for use in framing raised beds. An added bonus of using pallet lumber is the rustic appearance it contributes to the bed.

Both the standard size and mini version of the Easy Access Raised Garden Bed are available for viewing at the Noble Foundation Center for Pecan and Specialty Agriculture, located on the main campus in Ardmore, Oklahoma. ■

Early detection, management practices control pink eye

by Ronald Trett / rdtrett@noble.org

The recent rains in 2015 and 2016 have resulted in a flush of early weeds and grasses producing seed heads that can be one of the contributors to pink eye *(Moraxella bovis)*. Pink eye is a bacterial infection that causes inflammation of the eye. It can cause temporary blindness or in some cases permanent loss of vision. Pink eye is contagious and can spread rapidly. Face flies are also a huge contributor in the spread of the infection. The flies will land on the drainage from the eyes and transfer it to other animals. The secretions from an infected animal are another means of spreading the infection to other cattle. It can begin with a simple seed head getting lodged in the eye and progress to a full-blown infection.

Early detection is the key to prevent the rapid spread of infection in your herd. Learn to watch for early signs and symptoms:

- Heavy watery eye discharge (tear trails).
- Excessive blinking due to sunlight sensitivity.
- Cloudy cornea.
- Redness of eye and surrounding tissue.
- Mild to moderate elevation of body temperature.
- Decreased appetite.

When you recognize any of these symptoms, you should inspect all animals that have come in contact with the affected animal in order to determine the course of treatment needed. If possible, you should try to isolate any animals presenting symptoms. One recommended course of treatment is to administer the antibiotic Oxytetracycline by intramuscular injection according to product label. This is a more expensive approach than most eye ointments but has been proven to be more effective with faster results. If the infection has progressed to the point that the eye becomes cloudy and blood vessels are growing across the cornea, you will need to apply an eye patch. In most cases, the patch is applied to preserve the vision in the affected eye. In severe cases, a veterinarian can suture the eye closed.

Implementing a few best management practices can be one of the most effective ways to prevent pink eye.

- Fly control is one of the most important practices you can implement. There are many different ways to reduce the number of flies including ear tags, fly spray, dust bags or treated back rubs. Rotating cattle through different pastures to reduce the buildup of manure piles can also help with fly numbers.
- Mow pastures or use grazing practices to reduce the amount of seed heads and thistle that can become lodged in the eye.
- Isolate any new cattle purchased (incubation period is usually two to three days; in some studies, it has extended to three weeks).
- Consider vaccines for prevention, on the advice of your local veterinarian.

Pink eye can reduce feed intake, weaning weights and milk production, all of which can lead to financial losses. Infection rates can change from 1 or 2 percent up to 80 percent of the herd at the peak infection rate. Each producer will need to determine the course of action to take based on the economic impact to his or her individual operation. ■

Teeth condition can reveal cow age, aid culling decisions

by Robert Wells, Ph.D. / rswells@noble.org

As fall approaches, producers should start to think about which cows will be culled after they wean their calves. Many considerations must go into deciding whether a cow stays in the herd for another year. Some of the most typical are: disposition, physical structure, body condition, udder condition and structure, general health, and age. However in many herds, the age of the cow may be questionable or outright unknown. In order to maintain condition in a pasture setting without copious amounts of supplemental feed, a cow must have a full set of teeth that have not been worn down too much. Using dentition, or the condition and wear, of the cow's teeth can be a useful tool to determine if the cow should stay in the herd for another year.

The age of younger cows can be closely estimated by the number of permanent incisors present on the lower front jaw (See Table 1). The difficulty in aging a cow comes when looking at middle aged (6- to 10-year-old) cows. Rather than the number of permanent incisors that have erupted, tooth wear and degree of separation between teeth is the indicator of age in older cows.

In general, a heifer younger than 18 months will only have her temporary milk or "baby" teeth. The teeth will often be loosely set in the jaw. By 18 months of age, there will be space between each tooth so that one will not touch the next. At 18 months to 2 years of age, the heifer will lose her center two milk teeth, which will be replaced with the first of the permanent incisors, called pincers. The pincers will be the middle two teeth on the front lower jaw. Then every following year, she will lose the next set of teeth beside the last permanent tooth that has erupted on each side until she reaches 5 years of age when the corner incisors fill in.

Table 1. Age of cow based on dentition.

Actual age	Teeth present	Other comments
Less than 2 years old	Only baby "milk" teeth present	
2 years old	Two permanent incisors present	Will be the middle two incisor teeth; called pincers
3 years old	Four permanent incisors present	Called first intermediate; one on each side of pincers
4 years old	Six permanent incisors present	Called second intermediate
5 years old	Eight permanent incisors present	Called corner incisors
Older than 6 years old	All teeth present	Age based on tooth wear, separation and visibility of tooth root.
About 12 years old	Some may be missing	Arch in mouth has disappeared and teeth become triangular with extremely noticeable wear.

From 6 years old and on, age is determined by tooth wear, separation between teeth or disappearance of teeth. The degree of wear on the biting or grinding surface of teeth will be used as an approximation of age. However, care must be used as the type of forages consumed and grazing intensity (how closely to the ground the cow must eat) will affect the amount of apparent tooth wear. Cows grazing in sandy or rocky pastures may have exaggerated tooth wear and be younger than dentition indicates.

Once cows become older than 10 years, years of age are typically replaced with general terms such as short and solid, broke-mouthed, or smooth-mouthed (gummer). The terms are defined as follows. Short and solid means there is significant amount of wear to the cow's incisors but they are all still present and solidly attached to the mandible. Broken-mouthed indicates a cow is missing one of the incisor teeth. The smooth-mouthed description indicates the cow has lost or completely worn down most if not all of her teeth. Worn teeth may still be present but worn down to the gumline, hence the term gummer.

In summary, cow dentition can be used to estimate a cow's age, but more importantly it can be used to determine if she is capable of biting and chewing forage efficiently for another year of life on the ranch. If a cow does not have the dentition to efficiently harvest forage, she will have a difficult time maintaining body condition. Cows that have missing or extremely worn teeth are candidates to leave the breeding herd and be replaced by younger females. ■

Deer surveys remain popular despite weaknesses

by Will Moseley / wamoseley@noble.org

Deer surveys are a common practice in many deer management programs. Several techniques such as spotlight surveys, camera surveys and daylight cruise surveys are used to gather population data such as deer density, fawn crop and buck-to-doe ratio. In late summer and early fall, managers take to the field to try to determine population parameters so they can set harvest limits for the upcoming deer season. So how accurate are these surveys?

Deer surveys are not a census. A census collects information from every individual within a population; a survey collects information from a sample of a population. There are also many assumptions associated with deer surveys. For example, camera surveys assume does and bucks use bait stations equally, and spotlight surveys assume deer use the surveyed habitat equally as the unsurveyed habitat. Research has shown that bucks use bait stations at a higher proportion than does and fawns, so camera surveys underestimate the doe and fawn populations. In general, camera surveys underestimate the total deer population.

Spotlight surveys and daylight cruise surveys can be inconsistent depending on weather conditions and management activities. In years of abundant rainfall, the herbaceous vegetation can be so abundant that it can be difficult to see deer compared to drier years. Also, prescribed burning can increase visibility. Daylight cruise surveys have been conducted on an approximately 2,600-acre ranch for several years, and there is tremendous variability in the data. One year, the surveys indicated there were 0.4 does per buck. The next year, the survey indicated there were 7.8 does per buck. We have maintained a conservative buck harvest, so those numbers probably do not reflect the true population parameters. The daylight cruise surveys have indicated a similar pattern with the fawn crops as well. Vegetation conditions contribute to the variability in observed fawn crop since they can be hard to spot with abundant vegetation.

So why do so many people conduct surveys if they have so many weaknesses? It is because deer surveys can provide some information about deer populations compared to doing nothing, and some deer management programs through state agencies require them. We can look for long-term trends in the data, but it is difficult to confidently make harvest recommendations based on one year's worth of data. The best data a manager can collect is harvest data. It is best to look at long-term trends in harvest data as well. These data can tell us more about the health of the deer herd than surveys if the sample size is large enough.

Despite their shortcomings, deer surveys can be useful in some situations. They can be used to supplement harvest data, and we can look for trends in long-term data sets. However, we cannot make accurate harvest recommendations based on yearly surveys. Too often managers put too much emphasis in yearly survey results. For most deer management goals, we should put more harvest pressure on does than bucks and monitor the population parameters by collecting harvest data. There will be natural yearly variability, so we should avoid a knee-jerk reaction to surveys, which are not very accurate to begin with. ■

Daylight cruise surveys are conducted for white-tailed deer.

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UPCOMING EVENTS

For more information and to register, please visit www.noble.org/events or call 580-224-6376 or 580-224-6375. Preregistration is requested.

White-tailed Deer Management Workshop

9 a.m.-4:15 p.m., Aug. 25, 2016
Arcadia Conservation Education Area
Registration Fee: $20, includes lunch

Integrity Beef Meeting

5:30-8 p.m., Aug. 30, 2016
Ardmore Convention Center
Registration Fee: $20 for nonmembers

Fall Cattle Seminar

1-5 p.m., Aug. 30, 2016
Ardmore Convention Center
No Registration Fee

Fall Grazing Workshop

9 a.m.-3 p.m., Sept. 13, 2016
Dixon Water Foundation
Registration Fee: $20, includes lunch

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