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AGRICULTURAL DIVISION RESTRUCTURING: OVERVIEW

Agricultural Division reorganizes to optimize impact

by Billy Cook, Agricultural Division director / bjcook@noble.org

Agriculture is an ever-evolving industry. At the Noble Foundation, we strive to stay up with this evolution. At times this can be accomplished by small tweaks and changes to the way an organization has always done business. Occasionally, to remain relevant, you have to dig deeper and look at your organization closely to ensure that you are focused on the right long-term objectives and that the organization has the right strategies in place to achieve them.

Over the past 15-plus years we have been tweaking things in the Agricultural Division. A little more than three years ago, Bill Buckner became president and CEO of the Noble Foundation. This transition in leadership offered the Ag Division a chance to look deeply at our purpose and processes. We took this effort very seriously and began an in-depth study of who we are and how we want to approach benefiting agriculture and agricultural producers. About a year ago, the Ag Division dove into a major strategic planning process to identify our strengths, understand our weaknesses and, ultimately, adapt to rapidly changing producer needs to optimize our impact on the future of agriculture.

Most strategic planning efforts take a small subset of people in an

organization and put all the decision-making power in their hands. We did the exact opposite. We spent days meeting and discussing issues, opportunities and strategies, with each meeting completely open to the entire Ag Division. Initially, it was a slow and often painful process as we studied things we thought we had done well, along with things where we were less successful, but we soon gained traction and became a stronger, more engaged and functional group that had common focus on the future.

In this article, I want to share a quick overview of the outcomes from this effort. This will be one in a series of *Ag News and Views* articles explaining the division's restructuring. In subsequent *Ag News and Views* issues we will go into more detail relative to our strategies and tactics.

During our planning process, we developed three main objectives that were deeply rooted in our mission to advance agriculture and help producers.

First, we **strengthened our producer relations efforts** through the addition of educational resources that complement our traditional consultation program. We realized we are working with an increasingly diverse group of producers with many needs from both an education and consultation perspective. We have seen an increase in the number of novice producers, and we want to provide them with additional educational resources to supplement one-on-one consultation. We understand that the needs for different segments of producers are continuing to expand and a "one-size-fits-all" approach to consultation is antiquated. We are adding consultation expertise in areas of need, and we are adding educational expertise dedicated to developing resources and exploring new educational methods beyond our traditional seminars and publications. Also key to this effort, we recognized that agriculture must do a better job of selling ourselves and telling our story, so we are focusing more on producer-driven agriculture advocacy.

Second, we are **focusing our research efforts and developing centers of excellence** in areas we are uniquely positioned to influence. When we closely examined all of our research and demonstration efforts, we saw four areas emerge. Much of our research is focused on improving agricultural systems and adding technology to those systems. We combined programs and reallocated resources to form the ***Center for Advanced Agricultural Systems and Technology***. Pecan production and the development of specialty agriculture enterprises were identified as areas of focus for us, so we created and resourced the ***Center for Pecan and Specialty Agriculture Development and Technology Advancement***. We have always recognized that the economic relevance of our research results and recommendations is of the highest importance, as is a strong economic focus on the operations of our own agriculture enterprises, so we formed the ***Center for Economic Information and Analysis***. The final center that we created through this planning effort is the ***Center for Land Stewardship***; we fully recognize that most of the collaborative activities that we as a division undertake are centered on some aspect of land stewardship. The Center for Land Stewardship is focused on collaborating with others, leveraging resources of those with common interests, and facilitating meaningful outcomes of these collaborations to ultimately impact agriculture's ability to be better stewards of our natural resources.

Third, we **developed a new internal management system for our operational resources** to improve service and support for our research efforts and to be better stewards of the resources we are allowed to manage. There are numerous operational activities going on within our division on a daily basis. We reorganized management of these operations to be more effective in carrying out the day-to-day activities necessary to producing high quality research while fully supporting education and consultation efforts.

Finally, through this process we learned a great deal about ourselves. How we show up in particular situations, how we manage staff, are we really engaging and empowering staff, how effective are we as leaders not only in our organization but across the industry as a whole? Many times, understanding and responding to these learnings are the most valuable lessons of all.

Stepping back and thoroughly examining our strengths and weaknesses has allowed us to develop strategies to apply our resources in novel and creative ways. These strategies will provide the opportunity to develop a long-term, structured approach conducive to meeting the future needs of agricultural producers. ■

New raised bed design accommodates more gardeners

by Steve Upson / sdupson@noble.org

In the article "A Raised Bed Designed with Your Back in Mind," which appeared in the April 2004 edition of *Ag News and Views*, I discussed the use of corrugated sheet metal to construct a 14-inch-high bed that enables gardening while in a seated position. This bed design has been well received by gardeners with physical challenges as well as the general gardening public.

Since the introduction of the corrugated sheet metal bed, several people have asked me to take bed design to a higher level, i.e. design a bed that can be utilized while in a standing position. Interest in stand-up gardening continues to escalate as the age of the baby-boom generation increases. With increasing age, folks find it more difficult to stoop while performing everyday activities, including gardening.

In 2006, I began exploring design options for a standing position raised bed. To qualify for consideration, a design would need to meet as many of the following criteria as possible: 1) lower construction cost compared to similar sized beds, 2) utilize readily available construction materials, 3) incorporate used or discarded materials to reduce cost, 4) easily modified to accommodate the height requirements of young and old, 5) ergonomically friendly, 6) free standing so as not to require anchoring in soil, 7) not more than 40 inches wide to enable access to the middle of the bed without reaching, 8) easily fitted with options such as crop trellising, shading and a miniature greenhouse covering.

After considering several designs, I settled on one that utilizes discarded truck (tractor-trailer) tires to create an elevated base, which supports a 2-inch by 4-inch lumber framed bed lined with corrugated sheet metal. When filled with soil, the tires create a strong, inexpensive base that does not require anchoring due to its large mass. The unique shape of the base imparted by the round shape of the tires enables the gardener to place one foot under the bed while standing at the side of the bed, effectively reducing stress on the lower back. Coincidentally, the most commonly available size of truck tire (as determined by a survey of discarded tires at a local truck stop in Ardmore, Oklahoma) has a diameter of 40 inches, ideal for the desired bed width.

This unique design can be used to construct a bed of any length and up to 35 inches in height. The height can be lowered to accommodate shorter gardeners by simply reducing the length of the framing material. The bed's heavy duty construction accommodates the use of a soil-based growing medium. The bed will also support different sizes of containers for those interested in container production.

To top off the bed, I designed a protective cover that enables the gardener to extend the growing season and protect plants from inclement weather.

We believe the name "Easy Access Raised Garden Bed" best describes the bed for its ease of access and user-friendly characteristics. It is also easy on the pocket book. The cost of materials to construct a 10-foot-long by 40-inch-wide by 35-inch-high bed is $246. To construct a miniature tunnel cover for the bed will only set you back another $80.

Construction plans for Noble Foundation Easy Access Raised Garden Bed are available on our website at www.noble.org/ag/horticulture/easy-access-raised-bed. ■

Planning, management promotes year-round grazing

by James Rogers / jkrogers@noble.org

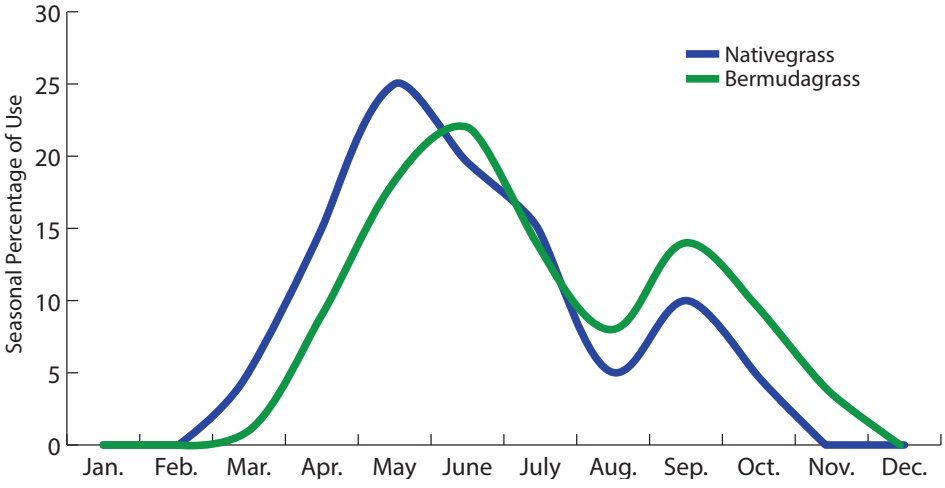
Grazing season is most commonly thought of as grazing during a period of time while the base forage is actively growing. This works great for producers who are seasonal in nature, such as stocker operators who grow winter annual pasture then completely utilize the pasture with stocker calves. However, for a cow-calf producer, thinking this way is very limiting to grazing management. For example, the figure below is the percentage of bermudagrass or nativegrass available for grazing during the growing season. Planned grazing during the growing season only limits grazing management options for the remainder of the year. Grazing managers should not limit their thinking to a season or period in time but rather expand their thinking to planning for multiple seasons and year-round grazing management.

As a grazing manager, success is tied to stocking rate or the number of animals grazing an area of land for a period of time. As mentioned previously, cow-calf producers should think of the period of time as a year. Note in Figure 1 that the majority (70 percent) of bermudagrass and nativegrass growth occurs prior to mid-July. This means the amount of forage available for grazing is greatest in spring and early summer. Animal performance is directly tied to forage availability; therefore, animal performance should also be greatest in spring and early summer. For a spring-calving cow herd, it is time for the cow to maximize milk production, add body condition and rebreed. If stocking rate is set too high in an attempt to utilize all of the abundant seasonal spring growth, then there is risk of limiting forage intake and cow performance due to restricting forage availability. Other risks include reducing total forage yield, possibly reducing plant persistence, and increasing cow carrying costs due to increased supplementation from reduced forage availability the remainder of the year.

For long-term sustainability of both the livestock and the forage base, set a stocking rate based on a time period of a year and the amount of forage the operation can produce in a normal rainfall year. Excess forage will likely be available during the spring, but that can be utilized later in the year. Combine this with a controlled rotational grazing plan. Rotational grazing presents additional forage management options such as allowing for stockpiling forage for fall grazing. Grazing intensity and duration can also be controlled through rotational grazing. Highly productive pastures can be grazed harder, and weaker pastures can be given an opportunity to rest and recover. A side benefit to rotational grazing is that over time, the cow herd will become easier to handle and work.

Preparation is key for making a year-long grazing system work. The grazing manager needs to be thinking at least one season ahead and maybe two. Learn the yearly flow of both perennial and annual forages. Take into account rainfall that is received in one season and how that will affect forage production in the next season. In summary, be flexible, proactive and have a mindset of year-long forage flow in addition to solely seasonal grazing. ■

Figure 1



High input prices necessitate judicious use

by Eddie Funderburg / efunderburg@noble.org

This article originally appeared in the May 2008 Ag News and Views *newsletter.*

With higher fertilizer and herbicide prices, a common question we get involves whether you get a "bigger bang for the buck" from fertilizer or herbicides on introduced pastures. Ideally, you would use both on introduced pastures that have weed problems, but input prices have made this a less-than-ideal world in pasture management.

Let's start with herbicides. Probably the most consistent work I have seen in agricultural research is that which shows that a pound of weeds killed will result in a pound of grass gained. A moderate to heavy infestation of weeds weighs in the range of 500 to1,500 pounds of dry matter per acre. While these weeds may be grazed somewhat while they are small, they are obviously not grazed much after that or they wouldn't be thought of as weeds.

If you use an herbicide that costs $10 per acre (including application) to control the weeds, you have gained 500 to1,500 pounds of grass for your money. This equates to a grass value of $15 to $45 per ton of dry matter forage gained for your herbicide cost. Unless you have high wildlife goals, weed control should be a priority in fields that have moderate to heavy weed pressures. If wildlife goals are important, they should be weighed against the grazing value obtained through the herbicide use. Also, if you have desirable legumes, you must decide whether the legume is giving you more than the weeds are taking away before you determine whether or not to spray.

To determine if you have enough weeds to spray, scout the fields at the time the weeds are emerging and beginning to grow to determine the species and quantity of weeds in your fields. If you don't have enough weeds to justify spraying, you can save money. It is difficult to describe a moderate to heavy weed infestation. If you're pretty sure weeds are causing you to lose significant grazing, it is probably enough weeds to justify spraying.

Does fertilizer pay? Most work in the southern Oklahoma and north-central Texas area shows that nitrogen fertilizer will give a yield increase of about 30 pounds of dry matter forage per pound of nitrogen above the amount produced with no nitrogen. If urea is $500 per ton, this means that the cost of nitrogen fertilizer to produce 1 ton of dry matter forage is $37. While this is much higher than in the past, it is still cheaper than buying feed and bringing it in.

The above calculation only considers nitrogen (N). Phosphorus (P) and potassium (K) prices have gone up as much or more than nitrogen. If you need to use P and/or K with nitrogen, the increased cost makes fertilizer use on pastures less profitable, or even unprofitable, at current prices. If your soil is low in P and/or K and you do not apply them as fertilizer, nitrogen use efficiency will not be 30 pounds of dry matter forage per pound of nitrogen applied. It will be much less. Therefore, it is not advisable to apply only nitrogen fertilizer to soils that are low in P and K because the yield increase you receive will be unprofitable.

One possible way to maximize fertilizer inputs on pastures is to examine your soil tests and use nitrogen fertilizer on the fields that have adequate P and K and only need nitrogen. Do not use nitrogen on the fields that need P and K. If you can get animal manures, apply them only on the fields that need P and K since they have about as much P_2O_5 and K_2O as they do N and will build up the P and K levels in the soil.

If you fertilize fields with moderate to heavy weed pressures, you definitely need to use herbicides. Fertilizing without controlling weeds will result in very abundant, large and healthy weeds.

In summary, if you have a lot of weeds, it is definitely economically feasible to control them unless you have very strong wildlife goals. It is still economically feasible to fertilize introduced pastures if you only need nitrogen (soil test to find out if fields are sufficient in P and K) or if you can get animal manures delivered and spread at a reasonable price. ■

Wetlands provide ecological and economic benefits

by Will Moseley / wamoseley@noble.org

Wetlands come in many different forms. They can be tidal zones, marshes, bogs or swamps among many other types. However, they all share characteristics that make them wetlands. They are areas where water is present above or near the surface of the soil for at least a portion of the year, and the soil and vegetation present is determined by the presence of water. Some wetlands need to be dry for part of the year to maintain their hydrologic cycle. Wetlands provide several ecosystem services such as reducing erosion, recharging aquifers and providing habitat for several wildlife species.

Unfortunately, in the past few hundred years, we have lost more than half of the wetlands in the United States. We currently have about 110 million acres of wetlands, but we continue to lose more every year. Most of the reasons that wetlands were lost are due to humans altering them. Some of the main reasons for altering wetlands were draining for farming and urban development, and channelization for flood control, navigation and urban development.

Wetlands act as a natural sponge. When high rainfall events occur, surface water must go somewhere. Wetlands catch and slow down the flow of surface water then slowly release the water, which significantly reduces the amount of flooding downstream. Since the water is slowed down, there is time for it to recharge ground water and improve water quality because sediments fall out of the water column and nutrients are taken up by aquatic plants. Wetlands also act as bioremediation sites because they have the ability to remove pollutants from surface water. They are so good at this they are sometimes used to treat wastewater.

Wetlands provide excellent habitat for many fish and wildlife species. Several fish species use wetlands to breed and raise young. Wetlands provide cover, food and water for several wildlife species such as muskrat, red-eared slider and bullfrog, as well as nesting, breeding and feeding for several avian wildlife species such as waterfowl, blackbirds and cranes. Wetlands tend to have higher plant diversity than the surrounding area, which is good for most wildlife species. In parts of the Great Plains, wetlands act as an oasis due to the increased plant and animal life around them.

Due to the critical ecological services that wetlands provide, it is important to maintain existing wetlands. There are landowners and conservation groups that are protecting and creating wetlands in critical areas to benefit certain wildlife species. For instance, wetlands in the prairie pothole region in the northern Plains have been a focus because it is a nesting area for ducks. Wetland conservation has played a major role in increased duck numbers. Maintaining and creating wetlands can also have impacts locally. Nonmigratory and migratory animals benefit, and water quality is improved. The economic benefits to wetlands are numerous as well. Improved water quality, flood control, wildlife and fisheries habitat, and recreational opportunities are just a few economic benefits that wetlands provide.

Wetlands are an important, yet often overlooked, resource. Keeping them healthy is critical to maintain clean water and to support wildlife and fish populations. ■

Feeding nitrate-containing forage requires caution

by Robert Wells / rswells@noble.org

Nitrate toxicity can be a serious problem in cattle and other ruminants. They are more prone to toxicity because the microbes in the rumen convert nitrate (NO_3) to a more toxic nitrite (NO_2) form. However, since horses are hindgut fermenters and do not have the extensive ability to ferment forages like cattle do, the risk is lower.

Plants such as sudan, johnsongrass, sorghum, corn and pigweed can be nitrate accumulators under the right set of environmental conditions. Additionally, excessive amounts of fertilization can increase nitrate concentrations in the plant. Normally, plants take up nitrate from the soil and convert it into protein in the leaves. When the plant becomes stressed by drought, cloudiness, cold weather or even too much moisture, the metabolic process slows down. However, the uptake of nitrates from the soil continues at a higher rate for a brief period of time, thus, building up excessive nitrates in the stem of the plant.

When nitrites are created from nitrates in the animal and then absorbed into the blood stream, they bind with hemoglobin to form methemoglobin, which cannot effectively carry oxygen. Nitrate poisoning may produce the following symptoms: difficulty breathing and suffocation, lack of coordination, muscle weakness or tremors, blue or pale mucous membranes, diarrhea, colic, and even death. Blood of affected animals has a chocolate brown instead of a deep red color and is more watery.

Table 1.
Guidelines for use of nitrate-containing forages

Nitrate Percentage (dry matter basis)	Nitrate (NO_3), ppm	Precautions
0.25	2,500	Generally safe for all horses
0.25-0.50	5,000	Slight risk: don't feed more than 50 percent of the total diet to pregnant mares
0.50-1.0	10,000	Moderate risk: don't feed to pregnant mares and limit to less than 50 percent of diet to all other horse
1.0-1.5	15,000	High risk: use extreme caution when feeding to horses
>1.5	>15,000	Severe risk: do not feed to horses

Table 2.
Methods of adjusting nitrate content of rations using addition of concentrate feeds

		Percentage of total ration	
Nitrate in hay, % (dry matter basis)	Nitrate in hay (NO3), ppm	Nitrate containing forage maximum, % of total diet	Feed amount, % of total diet
0.5	5,000	100	0
0.75	7,500	(0.5 ÷ 0.75) = 67	(100 – 67) = 33
1.0	10,000	(0.5 ÷ 1.0) = 50	(100 – 50) = 50
1.25	12,500	(0.5 ÷ 1.25) = 40	(100 – 40) = 60
1.5	15,000	Don't feed: It would require too much grain	—

Adapted from: http://robeson.ces.ncsu.edu/nitrates-101/ and L.D. Lewis, 1995

Forages can be tested for nitrate concentration while growing or in hay. Estimating growing forages is problematic because nitrate content can change by the hour or day. Once the forage has been cut for hay, the quantity of nitrate in the plant is locked in since metabolism will cease once the hay becomes cured. But even with hay, there can be nitrate concentration variation due to location in the field and sampling and testing error.

Table 1 lists general guidelines for feeding nitrate-containing forages to various classes of horses. One must also take into account the level of nitrates that may be present in the water and other feeds that will be offered to the horse on a daily basis.

If there is no other option but to feed a high nitrate-containing forage, then it should be diluted with other clean hay and feed to reduce the nitrate levels to acceptable limits. Table 2 (adapted from L.D. Lewis, 1995) demonstrates how to calculate the dilution of the nitrate-containing hay with feed alone. I would suggest further diluting the nitrate-containing hay by feeding at least one-half of the total amount of hay in the table as clean hay, which does not contain nitrates. This will further reduce the nitrate levels in the hay to be safe. Additionally, caution should be exercised when feeding amounts more than 50 percent of the horses' daily dry matter intake.

Horses do have a higher tolerance to nitrates than cattle, but extreme caution should be exercised when feeding it. ■

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EVENTS

Pond Management Workshop
Time: 9 a.m.-3:30 p.m.
Date: May 8, 2015
Location: Noble Foundation Pavilion
Registration Fee: $20, includes lunch

Basic AG Livestock Management Field Day
Time: 9 a.m.-12 p.m.
Date: May 22, 2015
Location: Noble Foundation McMillan Road Farm
No Registration Fee

For more information or to register, please visit www.noble.org/agevents or call Maggie Scott at 580.224.6375. Preregistration is requested.

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