Recycling Agricultural Plastics a Way of Saving Energy and Conserving the Environment

Dr. Dirk Philipp, Assistant Professor

Each year thousands of tons of discarded agricultural plastics are burned, buried or dumped. The result is bad news for both the economy and the environment. Volatile toxic compounds pollute the air and debris clogs waterways, while recycling plastic waste could save energy and reduce dependence on foreign oil.

In rural areas, there are almost no recycling programs in place that would make it feasible for producers to consider the reuse of silage wraps, net wraps or any other plastic used in agricultural processes on a daily basis. Many producers don’t see any other option than burning these materials. However, as with any plastic compound, burning plastics in an open fire will create hazardous compounds, such as carbon monoxide.

Apart from air-polluting emissions, particulate matter can settle in the lungs of bystanders. Depending on the temperature of the fire, toxic compounds including polycyclic aromatic hydrocarbons can be released that are known to have mutagenic and carcinogenic effects.

Unfortunately, materials like bale wrap end up in roadside ditches or stream channels where they can seriously hold up the flow of water by being the perfect trap for driftwood or any other material. Debris in these areas can then become choking hazards for livestock and wildlife and create breeding grounds for mosquitoes or rodents.

Net wrap in particular gives some hay producers headaches, but this material has undeniable positive attributes. Usually made from high density polyethylene (HDPE), net wrap has allowed farmers to bale hay more efficiently than with twine and to store these bales with less damage outside in case a barn or shed is not available.

A few producers have switched to using biodegradable bale twine instead to get around the problem of lacking recycling options for net wrap. However, switching from net wrap to twine may be unfavorable in the long run from the perspective of farm economics. Research at the University of Wisconsin has shown that outside bale storage losses with net wrap are reduced compared with twine wrap. Net-wrapped hay also has a greater appeal and marketability, especially with the newer cover-edge wrap.

There are companies in Arkansas that have made the pitch to provide producers with recycling options for used agricultural plastics. One example is Delta Plastics in Little Rock, known for reclaiming used irrigation pipes. In Northwest Arkansas, Advanced Environmental Recycling Technologies, Inc. (AERT) of Springdale considers providing landowners with the opportunity to recycle their used agricultural plastics in the near future.

Besides obvious environmental advantages of recollecting used plastics, recycling is also beneficial from an energy and economic viewpoint, says Al Drinkwater, a representative with AERT. “Producing agricultural plastics
Digestible Nutrients) is the term used for the measurement of energy (calories) conducted on a product of energy weight gain, reproduction and milk production in all biological systems. Maintenance, growth and vitamin. Energy is important for most variable, followed by protein, minerals and fat. Energy is required for the synthesis of dense packing.

Drink water encourages rural communities to develop strategies for collecting agricultural plastics. “Our goal is certainly to turn plastic waste that currently has a ‘negative economic value’ into a compound with a ‘positive economic value’ for the benefit of producers and the communities they live in.”

With a reliable recycling network for agricultural plastics yet to be established, the next best thing producers can do is to meticulously collect and discard used net wrap with the household trash. Although it is nobody’s favorite job to unwrap bales during dark, cold winter days, the net should be removed entirely and securely stowed away on the pickup truck or in the tractor when moving around the farm.

The net wrap should then be put into designated trash bags that can be picked up by your local waste collection company. With a routine in place, fields, ditches and stream channels are kept free of plastics, and a good collection scheme will be in place once a recycling market for agricultural plastics gets established in your area.

Nutrients Are Essential Heading Into the Spring Calving Season
Bryan Kutz, Instructor

Requirements for pregnant and lactating cows can present quite a challenge for operators but are very important to the well-being of the cow and to reproductive efficiency. Because factors such as cow size, environment and stage of production can change daily, a cow’s nutritional needs are constantly fluctuating. Most of these changes are rather small, and long-term nutritional programs will assist in managing these subtle issues.

The required energy levels are the most variable, followed by protein, mineral and vitamin. Energy is important for all biological systems. Maintenance, weight gain, reproduction and milk production are all a product of energy utilization in the beef cow. TDN (Total Digestible Nutrients) is the term used for the measurement of energy (calories) converted to pounds or percentage of the diet. Proteins provide for functions such as enzyme systems, muscles, nerves and soft tissues. Proteins are utilized by microorganisms in the rumen to reproduce and digest carbohydrates, which aid in supplying energy to the animal. The requirement for protein increases as cow size increases. Forages that are lush or vigorously growing typically will provide sufficient rumen protein. However, as the forage matures or the onset of feeding hay occurs due to weather conditions, the protein content will decrease, causing the need for supplementation.

Minerals also play an important role in many bodily functions. Bone mass and many of the enzyme systems, such as immunity, digestion, reproduction and milk production, utilize minerals. Mineral supplementation is very precise and difficult to manage because of the different mineral interactions. Small mineral changes can cause deficiencies.

Many of the vitamins can be readily available in growing forage. Vitamin A can be stored in the liver with protection for up to two to four months. Depending on when availability of your growing forage was depleted and supplemented with hay and calving season begins, vitamin A could become deficient and require supplementation. Requirements for vitamin A are 1,250 IU/lb of dry feed for pregnant cows and 1,770 IU/lb of dry feed for lactating cows. Cows rarely need any vitamin D supplementation because it is synthesized by beef cows exposed to sunlight or fed sun-cured forages. Vitamin E requirements depend on concentration of antioxidants, sulfur-containing amino acids and selenium in the diet and can be quite difficult to determine. Vitamin E is not stored in the body in large concentrations. The vitamin E requirement is estimated to be between 7 and 27 IU/lb dry diet.

The table below lists some of the basic nutrient requirements. This is based on an 1,100-lb mature cow with a peak lactation of 20 lb at different intervals after parturition. These nutrients are the basis of efficient production and ultimately will affect profit/loss.

Table 1. Nutrient Requirements of Mature Beef Cows 1,100 lb Mature Weight, 20 lb Peak Milk

<table>
<thead>
<tr>
<th>Months Since Calving</th>
<th>DMI (lb/day)</th>
<th>TDN (lb)</th>
<th>NE (Mcal)</th>
<th>CP (lb)</th>
<th>Ca (lb)</th>
<th>P (lb)</th>
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<tr>
<td>1</td>
<td>25.4</td>
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<tr>
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<td>15.6</td>
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<tr>
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<tr>
<td>5</td>
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<td>.042</td>
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<tr>
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<td>13.0</td>
<td>21.8</td>
<td>1.95</td>
<td>.053</td>
<td>.037</td>
</tr>
</tbody>
</table>

Nutrient Requirements of Beef Cattle, MP391, UA Cooperative Extension Service
Dr. Lusby Announces His Retirement
Dr. Tom Troxel, Professor

After completing 15 years as Department Head, Dr. Keith Lusby decided to retire effective February 15, 2011. Dr. Lusby, a native Arkansan, came from Oklahoma State University where he built a national reputation in teaching, research and extension. Dr. Lusby’s appointment brought instant credibility to the Department. Dr. Lusby’s leadership and vision were key factors in rebuilding the Department of Animal Science: increasing the number of faculty, rebuilding the research and teaching facilities and modernizing the teaching program.

Because of Dr. Lusby’s reputation and nationally recognized status, the Department was able to hire some of the best young scientists in the country. From about 17 faculty in 1995, the program grew to 26 faculty with teaching, research and extension appointments on the Fayetteville campus, at the Southwest Research and Extension Center in Hope and at the extension headquarters in Little Rock.

Developing a modern infrastructure for research, teaching and extension required funding from state and federal levels and launching a major private development campaign. It was Dr. Lusby’s foresight and his ability to work with industry leaders that provided the funds for numerous major building projects. A few of the projects include the Pauline Whitaker Animal Science Center, Red Meat Abattoir, livestock and support facilities at Fayetteville, grower/finishing swine facilities, Dorothy E. King Equine Pavilion and conference building and state-of-the-art beef cattle research facilities at the Batesville Research Station. These developments were made possible by building the image of a winning program that was on the rise.

The teaching program was modernized to reflect today’s Animal Science student, including an equine program. A minor in Equine Science was approved in 2005. As a result of these changes, undergraduate enrollment for the fall of 2010 reached 184, which is an all-time high. Because of the Department’s increasing national reputation, 29 graduate students are pursuing M.S and Ph.D. degrees. The Department of Animal Science has the highest number of students in the Honors Program of any Department in the Dale Bumpers College of Agricultural, Food and Life Sciences. When it comes to supporting students, Dr. Lusby is a positive visible leader. He always has time to visit with students and their parents, give them a personal tour of the Animal Science facilities or attend activities throughout Arkansas.

Dr. Lusby worked very hard at increasing undergraduate scholarships. During his tenure, the number of Department-endowed scholarships increased by 14. These contributors recognized the vast improvement within the Department of Animal Science and believed in Dr. Lusby’s leadership. Today, the Department provides approximate $50,000 in annual scholarships. This investment in the youth of Arkansas will result in a positive return for the Department, communities in which they live and the state as a whole.

Dr. Lusby has made a difference. His leadership, vision and dedication changed animal agriculture in Arkansas. Dr. Lusby’s accomplishments will influence future students, research and success of livestock producers for years to come. He will be missed.

New Year's Resolution – Keep Production Records
Dr. Brett Barham, Associate Professor

It’s a new year and many of us follow the tradition on making resolutions to work on during the new year. For this year, why don’t you make a resolution to keep better records for your cow-calf operation?

The business management side of a cow-calf operation is very important. Decisions have to be made on capital improvements and limiting tax liability, and financial records have to be maintained throughout the year. Because finding time to get it all done is a daily challenge, thorough record keeping is becoming increasingly important in managing a profitable cow-calf business. It used to be cattlemen could make a living just focusing on the cow and marketing a live calf. Now, costs are high and factors affecting profitability are many.

There is a saying, “You can’t manage what you don’t measure.” An unproductive cow is a costly cow. If you don’t have detailed information on the productivity of a cow, over time how will you know if she is costing more than she is making the operation?

Recording sales and expenses with financial records is also critical and allows managers to determine where the limitations and opportunities are for profitability. Additionally, tax laws are becoming increasingly complex, and in some instances, deductions from agricultural enterprises have been disallowed due to lack of production records.

Record keeping takes time, which is something everyone is short on these days: time to investigate how to keep records (paper, spreadsheets or computer record-keeping systems), time to set up records and time to update records. Owners and managers who are successful in fitting record keeping into their daily routine are finding the knowledge gained from the information generated by cattle records is invaluable in making good management decisions.

Getting Started

The first and most difficult step in tackling cow-calf business records is to just get started. Start small, generally with pen and paper. Record simple things
like breeding and calving information. Then move to recording weaning records and feeding information.

It is also important to keep track of all expenses from a production standpoint and for your tax records. Many people try to start off with computerized record-keeping systems and fail since they are not in the habit of collecting information to begin with. Computers can help keep things organized and can calculate things quickly, but they will not collect the information for you.

Developing a calendar or work schedule where you set aside time to update your records around the main events of a cow-calf production cycle will help you stay current and get the most benefit from your record-keeping system.

Once you have records, don’t just file them away. Take some time to evaluate your operation. Find your strengths and weaknesses and adapt your management to capitalize on these opportunities. Don’t know where to start? Contact your local county agent and take advantage of Extension resources to help you utilize your records to make improvements. Now is the time to improve record keeping and operate in 2011 with the added information to make quality management decisions.

### Youth Livestock Project Planning for the New Year

Steve Jones, Associate Professor

The junior livestock program is a unique opportunity to use live animals to develop the youth. The main objective of the program is developing the young person, not the animal. A secondary purpose is to teach 4-H members how to feed, fit, select and manage the animals they own. In the process of feeding and caring for an animal, 4-H members have the opportunity to develop many positive life skills. Youth do learn something about agriculture and livestock production and develop an appreciation for the livestock industry, but the main objectives are to teach life skills and help youth become productive citizens of our society. These skills are much more than physical skills and are a combination of acting, thinking and feeling. They help 4-H’ers function as adults in society and accept responsibilities, gain ability to communicate, inquire, solve problems, make decisions and work with other people. Other lifelong skills learned are goal setting and planning. Now is the time to set livestock goals and plans for 2011.

### Appropriate Housing

Before the actual selection of the project, you need to make some important preparations. The project(s) will need appropriate housing. Before livestock projects are purchased, facilities should be planned and built. These may include barns, fencing and additional shelter from rain if appropriate. Feeders and water tubs need to be purchased or built to accommodate the daily needs of the animals. A small area to store feed and hay will be needed. Furthermore, equipment such as grooming supplies, clippers, health supplies, ear tags, etc., should be available. It is difficult to build facilities after the animals are on the farm. Extreme changes in weather may cause health issues that affect the growth of the animals several months later.

### Selection

The 2011 Arkansas State Fair will be October 14-23, approximately a week later than in previous years. Leaders, parents and 4-H members need to check the dates of the shows in which they plan to participate. This is important in selection of age-appropriate animals, particularly the market swine, sheep and goat projects. You need to estimate the mature weight of individual animals and calculate the days on feed required to get to that target weight. Most of the major shows have a competitive weight range that animals must fit into. Also, you need to assess at what stage of maturity individual animals will “peak.” You may hit the legal weights, but the animal will not place very high if overly fat or too lean to meet industry acceptable carcass parameters.

The primary purpose for selecting animals is to obtain an animal that represents the best in the industry when properly fed and managed. This means that industry standards must be identified prior to selection. The common purpose for meat animal production and youth livestock projects is to economically produce high-quality meat desired by consumers. The industry standards for each of the species are very similar. Many of the factors considered in selection are similar for beef, sheep, goats and swine.

Thicker-muscled animals usually gain faster and require less feed per pound of gain since it takes more energy to grow fat than muscle. The Lean Yield is based largely on total muscle and total amount of fat cover. For example, a Yield Grade 1 beef carcass provides 54.6% of retail cuts while a Yield Grade 4 carcass provides only 47.5%. The beef yield grade is adjusted down (representing a higher retail yield) for rib eye muscle that exceeds a given standard. Therefore, heavier-muscled animals will have a better USDA yield grade (and more retail beef) at a given fat depth than similar weight thinner muscled animals. The same is true for pork, lamb and caprine carcasses.

The greatest production efficiency is achieved by animals at the top end of weight preferred by packers and consumers. Furthermore, animals with larger frames at a given weight have more feed capacity per unit of body weight and achieve greater feed efficiency.

Strong bone and correct skeletal structure are essential for the traveling framework required to obtain food and to reproduce. Select animals that exhibit strong correct skeletal structure. Balance is best identified as uniformity in the appearance of muscle, trimness and skeletal structure. Avoid animals that show a weak top line, crooked feet or legs or excessively short or long or excessively deep or shallow
Improper Dosing Can Be Costly

Dr. Jeremy Powell, Associate Professor, John Richeson, Graduate Student, and Carroll Prewett, Staff Chair

It’s 14 degrees outside and you finally got the calf to the chute to be treated. You’re ready to give the medication, but when you grab the bottle, the label was badly smeared from the last scouring calf that you treated. You stand there trying to remember, How many cc’s? Was it IM or SubQ?

Because of unforeseen circumstances common in the cattle business, it’s no surprise that we may sometimes unintentionally give our cattle the wrong dose of an antibiotic, dewormer or other medication. One should bear in mind some important economic considerations if the wrong dosage of medicine is administered. These include the additional cost of medication, labor, performance loss, need for retreatment and potentially death loss.

Administering the correct dosage of a medication when treating an animal can help ensure that overuse of an expensive pharmaceutical doesn’t occur and that there is minimal potential for any toxic effects to the animal or extended drug residue. Treating your animals according to their body weight will also ensure that potentially harmful underdosage does not occur, which could lead to treatment failure and may contribute to antibiotic resistance.

Medication labels are often written in a manner that assumes everyone utilizing the information is some type of scholarly mathematician. It can be quite a nuisance trying to jump from metric units to English units, and attempting to figure out how many milligrams, cubic centimeters (cc’s) and milliliters can all be rather confusing. Conversion factors are helpful in determining the right dosage when reading medication labels. We have listed some commonly used conversion factors in the table above (Table 1).

Because medication dosage is based on animal body weight, obtaining an accurate weight is a must; otherwise, we will inaccurately dose the animal. Consider a scenario where a stocker cattle producer is about to process 300 calves. Since this producer does not own a scale, individual body weight cannot be recorded to determine dosage for a dewormer treatment or for an on-arrival antibiotic. You can use an average weight from the bill of sale; however, anytime an average weight and dosage is used to treat a group of calves, you would be underdosing the heavier animals and overdosing the lighter animals for each lot. Worse yet, if you misplaced your bill of sale or simply don’t know the average weight of a group, an inaccurately estimated average weight can be a costly mistake.

For example, let’s say that on average each calf was given just 1 cc too much dewormer and antibiotic during processing and that the dewormer was $0.40 per cc and the antibiotic was $1.30 per cc. This would result in a $510.00 mistake in the overuse of medication to process the 300 calves. Therefore, an electronic scale can make economic sense by assuring the correct dose for each animal and would quickly justify the cost of a scale to weigh each animal. Also, it is very helpful to have dosage information about the commonly used medications for your operation posted near the chute for quick and easy reference. These dosages can be posted on a sign that indicates the number of cc’s per pounds of body weight. Figure 1 shows an example of a sign used for $1/mL = 1 cc (1 milliliter = 1 cubic centimeter)
1 fluid ounce = 30 mL
1 liter = 1,000 mL
1 gallon = 3,785 mL
1 kilogram (kg) = 2.2 pounds
1 pound = 454 grams
1 gram = 1,000 milligrams (mg)
1 teaspoon = 5 mL
1 tablespoon = 15 mL

Table 1: Commonly Used Conversion Factors

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Figure 1. Sign containing dosage information for commonly used medications posted near the chute provides a handy reference.
dosage information and how easy it can be to utilize when posted near the chute.

Regardless of the animal’s age, all intra-muscular and subcutaneous injections should be given in the neck region, never in the rump or back leg. Try to avoid administering more than one injection on the same side of the neck, but if you must, remember to place the injection sites at least 4 inches apart (at least one handbreadth between the two sites). Spacing injections in this manner will allow better response or absorption and less interaction between products, because moving only 1 to 2 inches between sites essentially creates one big site.

Processing cattle in muddy and wet conditions can increase the chance of injection site contamination. Therefore, make sure injection sites are as clean as possible before administering the product. Always follow proper volume-per-site instructions. When injecting antibiotics, never exceed more than 10 cc per injection site.

Remember to pay close attention to sterility of the product container and to the sanitation of syringes and injection systems. Because the rubber stoppers in the product bottles tend to dull needles very quickly, an unused sterile “filling” needle can be left in the stopper while the product is in use. When pulling up product into a multi-dose syringe, only use the filling needle that has been left in the stopper to fill up the syringe. This will ensure the sanitation of the container and alleviate the possibility of contaminating the bottle by a used needle. It will also ensure that you will not be using dulled needles to inject product into the animal. Always remember to read the manufacturer’s recommendations for dosage, route of administration, withdrawal period and expiration date.

As cattle producers, we supply this nation with beef. Today’s consumer demands that our product is wholesome and free from medication residues. In order to meet this justified demand, we all need to be diligent in assuring quality in our final beef product, and one very important factor is dosing medication properly. For more information about sound cattle production management, contact your county Extension office.