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PoultryPractices

Oklahoma Cooperative Extension Service

A newsletter for poultry producers and poultry litter applicators...

This issue:

poultrywaste.okstate.edu

Editor's Column

This issue focuses on the positive contributions of Oklahoma's animal production industries and provides considerations for those interested in alternative heating sources for poultry houses. We also look at the impacts of darkling beetles, offering prevention and control strategies. Finally, we've included an update on the current value of poultry litter as a fertilizer source.

For publications, regulatory information, and upcoming poultry waste management classes, visit your local County Extension Office or poultrywaste.okstate.edu where you can also obtain an electronic version of this newsletter.

Josh Payne

Economic Impact of Oklahoma's Animal Production Industries

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The positive economic contributions of modern animal production practices are often overlooked. More often, negative information is sensationalized by media, resulting in misinformation and misconceptions about the industry.

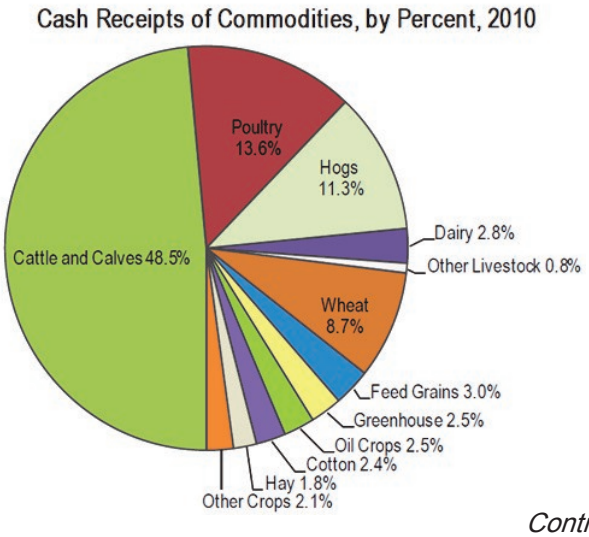
The figures below reflect the most current published agricultural statistics and illustrate the vital economic impact of Oklahoma's modern animal production systems.

In 2010, cash receipts for the top three agricultural commodities were:

1 - Cattle and calves at $3 billion

2 - Poultry at $834 million

3 - Hogs at $696 million



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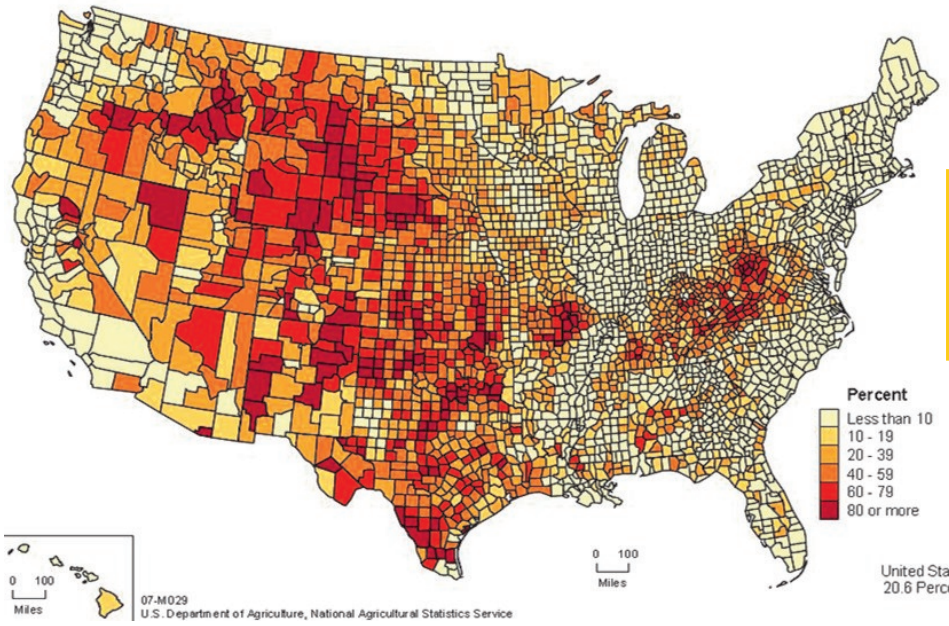
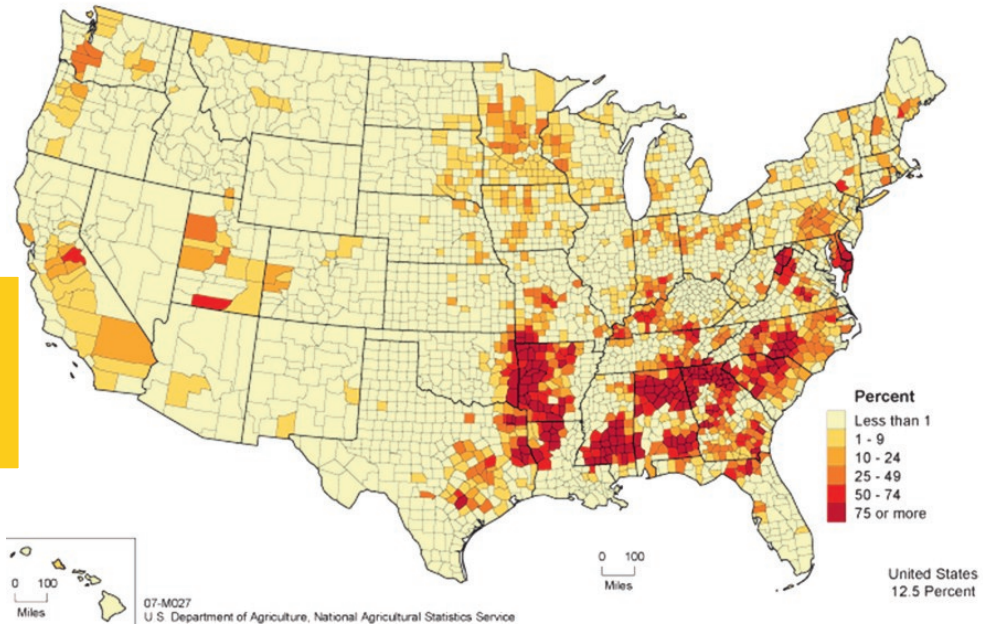
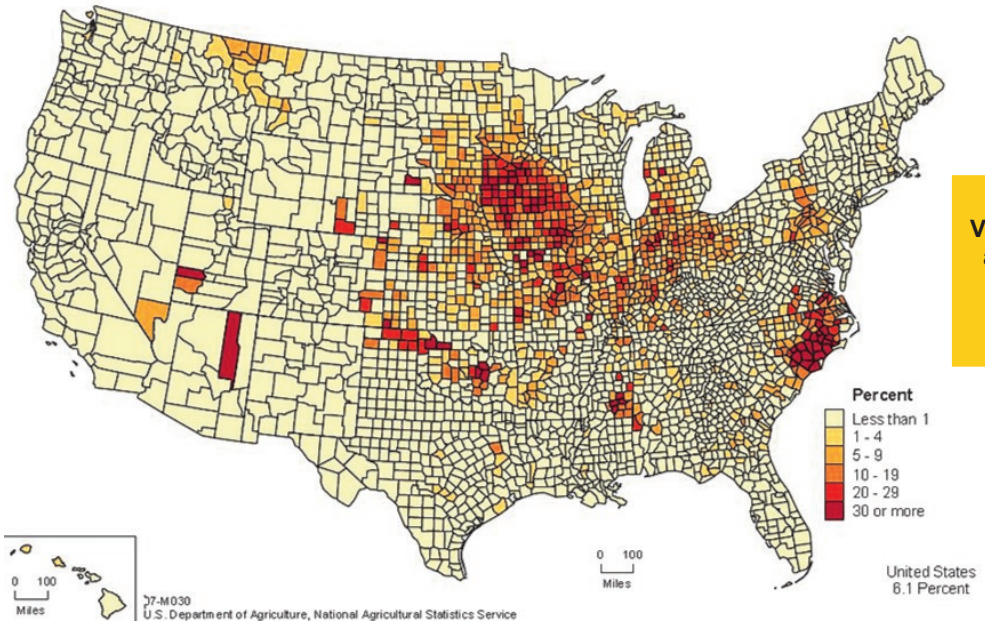
The following three figures illustrate the 2007 value of cattle, poultry, and swine as a percent of total market value of agricultural products sold. These figures are based on the most recent USDA Census of Agriculture, which is conducted every five years. As shown, the cattle industry is dispersed throughout Oklahoma, the poultry industry is predominately located in eastern Oklahoma, while the swine industry can be found in central and western Oklahoma. Each of these commodities account for a large percentage of the total market value of agricultural products sold.



Value of Cattle and Calves Sold as Percent of Total Market Value of Agricultural Products Sold: 2007



Value of Poultry and Eggs Sold as Percent of Total Market Value of Agricultural Products Sold: 2007



Value of Hogs and Pigs Sold as Percent of Total Market Value of Agricultural Products Sold: 2007

With less than 2% of the US population involved in production agriculture, the average American consumer may lack a full understanding of modern animal production practices or the necessity of their contributions. However, that same American consumes, on average, approximately 58 lbs of beef, 47 lbs of pork, and 56 lbs of chicken annually, reported as boneless weight.

The current world population is 7 billion and is expected to increase by 30% to >9 billion by 2050. According to the United Nations Food and Agriculture Organization, this growing world population will require an estimated 60% more food than we produce today. The majority of this increased demand for food is expected to be met by new and existing agricultural technologies with a minority coming from added farmland. Modern animal production will remain crucial for providing economic contributions and satisfying the constantly growing global demand for a safe, nutritious and affordable source of dietary protein.

References:

Annual Poultry Review. 2012. United States Department of Agriculture. National Agricultural Statistics Service, Washington, D.C. Accessed 1/30/2013. http://www.nass.usda.gov/Statistics_by_State/Oklahoma/Publications/Oklahoma_Livestock_Reports/2012/ok_poultry_review_2012.pdf

Undernourishment Around the World in 2012. 2012. United Nations Food and Agriculture Organization, Rome, Italy. Accessed 1/30/2013. http://www.fao.org/docrep/016/i3027e/i3027e02.pdf

About NASS

The USDA National Agricultural Statistics Service (NASS) conducts hundreds of surveys every year and prepares reports covering virtually every aspect of U.S. agriculture. For more information, visit:

http://www.nass.usda.gov/About_NASS/index.asp

Alternative Energy Sources for Poultry Houses: Background Homework

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One of the higher costs associated with running a broiler house operation is the wintertime heating costs. In Oklahoma most of the poultry houses are heated with propane from hanging infrared or forced air heaters. The cost of propane varies according to season and is also susceptible to the same issues that cause other petroleum fuels to rise and lower in cost. It is sometimes difficult to budget energy costs when propane prices are highly variable. Because of costs and this unpredictability, many producers have considered going to alternative poultry house heating sources such as wood, coal or straw. Let's examine some of the background issues associated with making such a fuel change.

First Things First:

First off, we need to be clear as to why we want to switch to a non-propane fuel source. There are typically about five reasons:

- Want to save money – get away from the propane costs
- Want to be more self-sufficient
- Want more convenience
- Interesting hobby – like to try new things (this is a legitimate criteria)
- Want to be more environmentally friendly with operations

> ***It is important to be honest with yourself and decide which of the above criteria you are really after. You probably cannot meet all – or even most — of the above criteria.***
>
> ***If you can't meet a certain criteria, does this stop the project?***

There are some things we need to do before seriously considering an alternative fuel heating system. We must know how much energy/fuel (Btu's and dollars) we typically use during the heating season. This will vary according to weather, but we need to have a feeling for this. This allows you to size the new heating system. Next we have to determine what is the current condition of our poultry house? Is the house tightly sealed (good static pressure) and well insulated? If not, then these problems need to be addressed first. It is bad practice to install energy projects into a building that needs basic structural improvements first. We need to start with a basically sound poultry house before experimenting with different heating systems. This may put the alternative fuel project on hold until addressed.

The Tough Questions:

Let's assume that the poultry house is in good shape and you have selected a new heating source such as wood or straw. You then have to answer the following questions:

- Can the new heating systems distribute the heat throughout the house?
- Can I throttle the system as heating needs change? What controls does the system have?
- Is the system efficient? If not, I might lose money even with a cheaper fuel.
- Does the system pollute? (Smoke, dust, etc.)
- What convenience do I lose? How much is the "hassle-factor"? How often do I have to tend this system?
- Is the system easy to maintain? If it breaks – who can work on it? The vendor? Myself?
- Is the fuel supply dependable? Local?

Almost certainly there will be some negative answers to the above question list.

You have to honestly consider what that would mean to you and the potential project.

More Than Just Fuel Cost:

While a comparison of fuel costs (per Btu) is very useful, it should not be the one and only decision criteria examined. One should include the true expected efficiency of the system. Many of the simpler (inexpensive) wood and straw furnace systems can run as low as 40% efficiency. In some cases, this can nullify the fuel cost/Btu advantage. When considering a new system, try to establish what the true running efficiency will be. This may not be easy to determine. Use your judgment and be conservative on estimates. The other costs to consider are:

- Material handling (delivery, fork trucks on site, conveyor systems, etc.)
- Storage (building sheds, bins, etc.)
- Maintenance (removing tars, ash, etc.) – this can be significant
- Your time (stoking, transporting fuel from storage, etc.)

Summary:

In a nut shell, an alternative energy system should be:

- Technically feasible (will the thing actually work well in your application?)
- Economically feasible (save money in the long run)
- User friendly (the "hassle factor" should not be so high that the system is a pain to run)
- Environmentally friendly (shouldn't produce so much smoke and waste that it becomes a nuisance)

If the system can reasonably meet your expectations in these areas you may have a good alternative energy project.

Litter Beetle Management

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Litter beetles are one of the most common poultry pests worldwide. Sometimes known as the darkling beetle or the lesser mealworm, the scientific name is *Alphitobius diaperinus*. It is generally thought that litter beetles originated from the sub-Saharan Africa and are considered an exotic species to the United States that was introduced from Europe during colonial times. One of the main concerns regarding litter beetles is their ability to harbor and transmit avian pathogens such as Fowl Pox, Marek's Disease, Newcastle Disease, Infectious Bursal Disease and protozoon agents. Another important pathogen group that litter beetles transmit is food borne pathogens such as *Salmonella* and *Campylobacter*. Because of their ability to transmit these pathogens, broiler operators are under greater pressure to manage litter beetles not only from a production point of view but also a bio-security point of view.

Figure 1: Litter beetles moving up a wall with new insulation after a house has been sprayed with an insecticide.

One of the more common aspects of litter beetles is their ability to reduce production efficiency both from housing and bird efficiency issues. The broiler housing issue arises from the beetle's biology where they seek pupation sites within the house insulation and other structures such as wood support structures. This aspect of their life cycle where they are actively consuming or making materials less suitable for proper temperature control is an area that operators struggle with throughout the year. To put a dollar value on estimated losses and cost of control from litter beetles within broiler production systems it comes out to over 14† million dollars annually. To apply this figure at more of a local scale, that comes out to $0.0023†/bird/treatment. Some estimates suggest houses that have a significant beetle population can result in losses of up to 25% of the insulation per year. Consider the cost to re-insulate a poultry house; this alone would justify control for the beetles. Furthermore, energy costs have been estimated to be up to 60% higher in litter beetle infested houses when compared to those that at least tried to control this pest. The effects of litter beetles on bird efficiency are caused by consuming the beetles or from general annoyance they cause the birds. Research has shown that weight gain and fed efficiency may be negatively impacted by birds feeding on adult beetles and larvae.

Litter beetles feed on bird droppings, spilled feed and dead birds. A broiler house provides an ideal environment for the pest including plenty of food resources and perfect climatic conditions. All life stages (egg, larvae, pupae and adults) can be found in the litter and higher concentrations of both larvae and adults can be found along the feed lines or pans. Most producers can easily see the adult beetles by merely looking under a feed pan. The typical time from when a beetle lays eggs and develops into an adult usually takes 30-40 days. Adults can live anywhere from three months to one year with female beetles capable of producing up to 2,000 eggs in a lifetime.

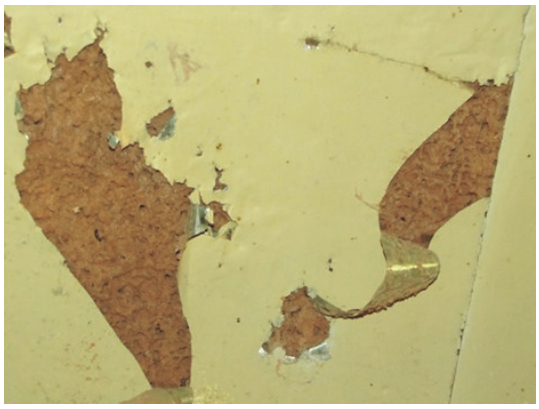

Figure 2: Insulation within a broiler house that has been damaged by litter beetles.

†Based on 1995 data from Georgia and adjusted for inflation to represent today's dollars.
1995 Survey of Georgia Estimates of Losses and Control Costs, M. P. Nolan, Jr. and D. C. Sheppard, University of Georgia

Controlling litter beetle populations depends on proper litter management practices and integrated pest management principles that target both biology and ecology of this pest. Preventing excessive feed spills and removing dead birds on a daily basis can prevent the beetles from thriving and spreading pathogens. Due to the reliance on insecticides to control litter beetles for the past three decades, the beetles have established the ability to develop insecticide resistance and in some cases the resistance can be seen within 2-3 grow-out periods. Because of this issue of resistance, producers are urged to rotate the type of insecticide utilized after being used on two flocks consecutively.

Figure 3: Insecticide being applied to a broiler house with a contemporary sprayer that utilizes less volume of water.

When a producer considers rotating the different types of insecticides, it is best to completely change the chemical class that the insecticide belongs to. For example, a producer will have to switch between a cyfluthrin product such as Tempo® and a imidacloprid product such as Credo D®; these two types of insecticides have different modes of action in how they kill the beetle. It is also important to apply the recommended rate and amount stated on the insecticide label because improper doses can promote resistance.

When selecting for insecticides that successfully keep beetle populations at a low level, they should have a residual activity of at least three weeks.

Most research demonstrates that it is best to apply the insecticide within 24 hours of removing the birds from the house and recent data collected in Oklahoma broiler houses that utilize windrowing as a litter treatment showed that a significant amount of beetles aggregated on top of the windrows within 2-3 hours after being windrowed. Another study found that low volume applications of insecticides (4-25 gallons of water) were more effective than higher application volumes (200-300 gallons of water). This demonstrates the benefit of utilizing a good sprayer that can apply accurate volumes to the litter.

Overall, litter beetle populations can fluctuate from house to house and complex to complex and this makes it difficult to have a blanket program for multiple complexes. The best option is to have a licensed applicator that is up to date on the currently approved insecticides for broiler production and utilize them in a team approach to handling the litter beetle problem.

Figure 4: Litter beetles aggregating at the top of a windrow approximately 2hrs after the litter had been windrowed.

Poultry Litter Value

2013 Update

What is litter worth? The actual value to the end-buyer depends on the nutrient needs of the field. Additionally, the cost of loading, transportation and application will affect the end buyer's total cost and should be considered when comparing the cost and benefits of litter vs. commercial fertilizer.

While keeping those facts in mind, the ***nutrient value*** of litter is commonly estimated based on current commercial fertilizer prices (reported as price/lb nutrient) and the litter nutrient analysis (reported as lbs/ton). For example, if calculating the N, P and K value of litter, we know that on average broiler litter contains 63, 61 and 50 lbs/ton of N, P_2O_5 and K_2O.

Using February 2013 prices for commercial N, P_2O_5 and K_2O and assuming long-term availability of 70 percent for N and 100% for P and K, we can determine the potential major nutrient value of the litter.

Litter N:	**$0.59/lb x 63 lbs/ton x 70% N availability**	**=**	**$26.02/ton**
Litter P:	**$0.42/lb x 61 lbs/ton**	**=**	**$25.62/ton**
Litter K:	**$0.45lb x 50 lbs/ton**	**=**	**$22.50/ton**
	Liming Value	**=**	**$ 2.00/ton**
	Total Potential Nutrient Value:		**$76.14/ton**

Check out the ***Fertilizer Value Calculator*** at ok-littermarket.org and download the free ***Fertilizer Decision-Support Computer Program*** available at soiltesting.okstate.edu for on-line tools to assist with comparing the value of litter to commercial fertilizer.

Poultry Waste Management Education classes are now underway for spring 2013.

For a complete list of dates and locations, visit:

poultrywaste.okstate.edu

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