Spring 2008 • Volume 10 no. 1

AVIAN Advice

UofA
UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE
Cooperative Extension Service

Energy Use and Costs at the Applied Broiler Research Farm

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INSIDE

Introduction

High energy costs continue to cause concern for poultry producers across the country. Currently, both integrators and producers are faced with increasing production costs, making normal operations more difficult. A number of farms, including the Applied Broiler Research Farm (ABRF), have recently been renovated in an effort to become more energy efficient and remain competitive. However, the high energy costs have prompted many producers to wonder if renovations are paying off.

Energy Use

The ABRF placed its first flock of birds in November of 1990 and sent birds to processing in January of 1991. The farm has always heated with propane. The data in Figure 1 show that propane prices averaged about $0.56/gal prior to 2000. Propane prices rose an average of about $0.13/gal between 2001 and 2007 and are currently at $2.04/gal.

Figure 1. Average ABRF Propane Prices

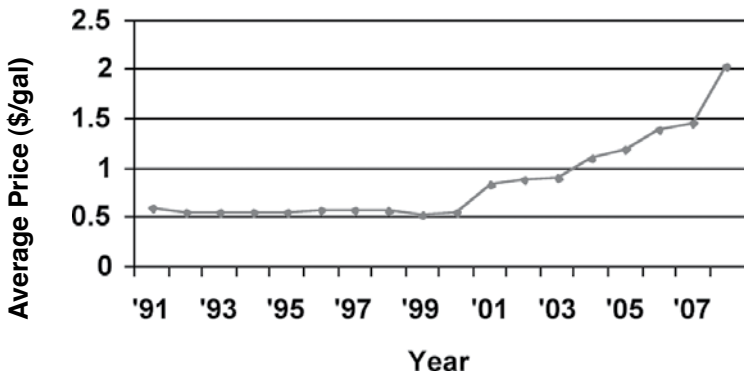

Figure 2. Propane use at the ABRF between 1991 and 2007

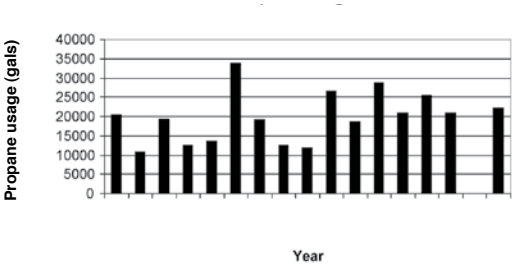

Figure 2 illustrates annual farm propane usage from 1991 through 2007. Data is not reported for 2006 because the farm was undergoing renovation from Jan-Apr 2006, thereby missing most of the cold weather that year. While the most propane consumed in any one year (33,800 gal) was in 1996, an average of about 17,000 gal was used between 1991 and 1997. Propane usage between 2000 and 2005 has averaged slightly over 23,350 gal. This increase in usage was likely due to air leaks in the houses and curtains (which were getting older) and brooding chicks at warmer temperatures compared to earlier years. Gas usage for 2007 (the only full year since the renovation) was 22,100 gals. So, has the ABRF used less gas since the renovation? With 16 years of before-renovation data but only one full year of data since the renovation, it is difficult to predict the long-term effect of renovation on propane usage. However, the total usage in 2007 appears to be slightly lower than the average usage for the previous six years since 2000.

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. . . helping ensure the efficient production of top quality poultry products in Arkansas and beyond.

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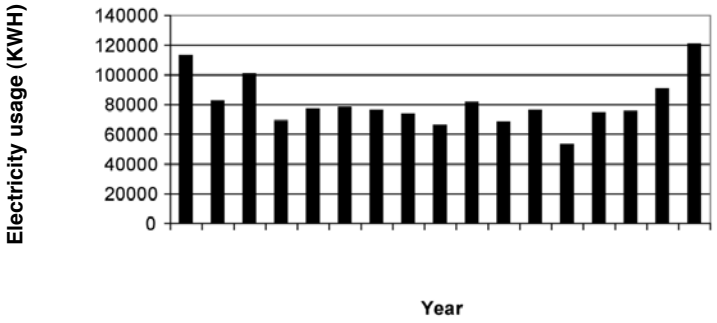
Figure 3. Electricity use at the ABRF between 1991 and 2007



Annual ABRF electricity use data are shown in Figure 3. After the initial three years of operation (1991-1993), electrical usage averaged about 75,000 KWH annually until 2006. When the farm was renovated, it went from four curtain-sided houses which were able to take advantage of both natural ventilation and natural day light, to four solid sidewall, tunnel ventilated houses that required power ventilation (fans) and artificial light both day and night. Electricity usage was expected to increase after the renovation and it did. After renovations, 2006 (a partial year running from April through Dec) used 90,941 kilowatt hours, while the full year of 2007 used 120,681 kilowatt hours. There is now better control of in-house conditions, providing a more uniform environment for the birds, but it comes with an increase in electricity usage and cost. So is the farm saving on electricity use since the renovation? No, actually more kilowatt hours have been used since the renovation than before. BUT our performance data suggest that the extra electricity translated into a better environment for growing birds, better bird performance and a bigger settlement check on a consistent basis (Tabler, 2007).

Figure 4. Propane costs at the ABRF between 1991 and 2007

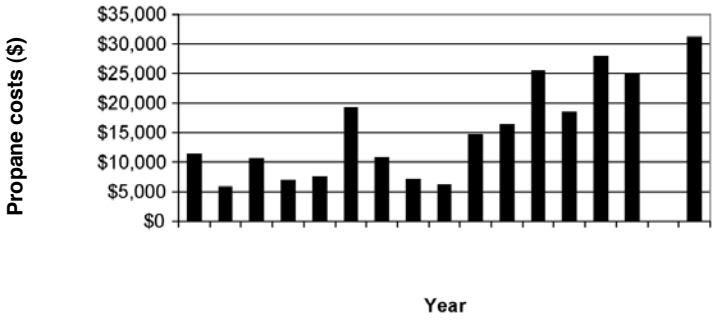
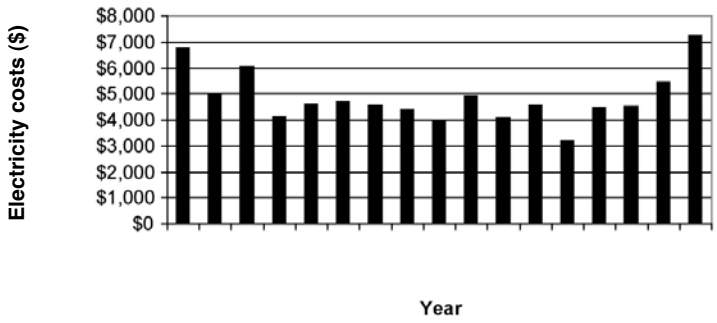


Figure 5. Electricity costs at the ABRF between 1991 and 2007



Energy Costs

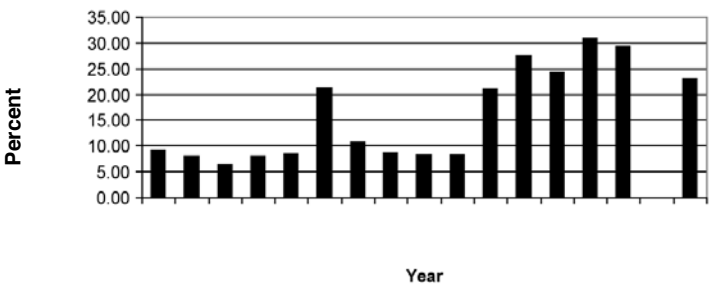
Annual costs for both propane and electricity have increased since renovation (Figures 4 and 5) and 2007 costs for electricity and propane were the highest ever in the history of ABRF. Yet, the reason for high propane costs was due to increased propane prices (Figure 1), while the reason for high electricity costs was increased usage rates not elevated prices (Figure 3).

Even though every integrator and every complex does things somewhat differently, most integrators have modified their broiler contracts to offer pay increases as an incentive to producers who renovate their farms. Some may also offer assistance with ammonia control products, bedding, or fuel allowance as an added incentive. However, after the energy bills were paid did we have more of the settlement check after renovations than before?

Energy Costs and the Settlement Check

The average annual propane cost as a percentage of the settlement check at the ABRF is shown in Figure 6. During the period 1991 through 2000, propane costs were almost always

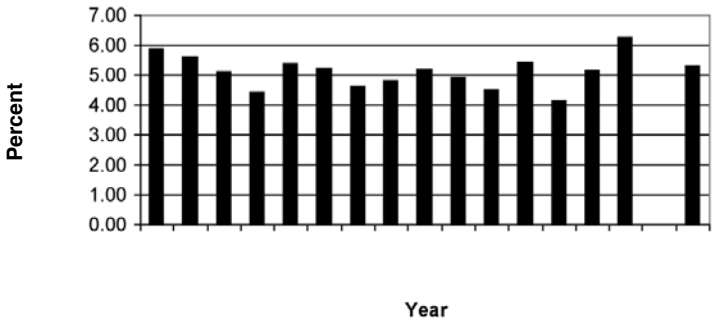
Figure 6. Historical annual gas costs as a percentage of the settlement check at ABRF



less than 10% of the check but, between 2001 and 2005, these costs amounted to more than 20% of the check, reaching a peak of 30.92% in 2004. In 2007 (after renovations) propane costs as a percentage of the settlement check were the lowest (23%) since 2001.

Electricity costs as a percentage of the settlement check have remained fairly constant throughout the history of the farm (usually about 5±1%) (Figure 7). Electricity cost as a percentage of the settlement check was 5.32% in 2007, similar to costs incurred during most years before renovation.

Figure 7. Historical annual electricity costs as a percentage of settlement check at ABRF



Average propane cost data in Table 1 show the same dramatic increase in energy costs seen in Figure 6. However, since the ABRF uses each settlement check to pay production costs, average data sometimes are not adequate. The table also contains the range of propane costs by flock and average January low temperature data obtained from NOAA. Since on average January is the coldest month of the year, temperature data were included to gage the influence of atmospheric temperature on propane costs. On average maximum propane costs before 2000 were 20.18% of the settlement checks, while after 2000 peak propane costs averaged 47.43%. Correlations between maximum propane costs and low temperatures prior to 2000 show a coefficient of -0.60, while similar correlations after 2000 show a coefficient of -0.16. These analyses suggest that low temperatures likely had a large effect on high energy costs prior to 2000, while price appeared to be the primary influencer after 2000. These data also suggest that had the ABRF not anticipated elevated energy costs, major cash flow difficulties could have arisen.

What This Means

While these data give some indication of energy use and cost before and after broiler farm renovation, they only reflect conditions at ABRF, which is on one site in Northwest Arkansas. It would be difficult to transfer these figures anywhere else with any degree of certainty. A farm across the road, across the state, or across the country would likely report different information than that presented here.

Granted, the ABRF is designed to be a typical four-house commercial broiler farm similar to thousands of others across Arkansas and the U.S. However, it is also unique, as is every other farm, in terms of its location, topography, elevation, geographical setting, wind currents, airflow patterns, other climate factors, and local energy costs. Energy use is also affected by the management program of the farm's integrator and how each grower applies the program. Therefore, it is important to understand the limitations of these data. The data represent one broiler farm and should be taken as such.

Table 1. Average and Range of Propane Costs per Flock as a Percentage of the Settlement Check (SC)

Year	No. Flocks	Av. Cost (% of SC)	Cost Range (% of SC)	Av. Jan. Low (degrees F)*
1991	5	9.11	1.17 - 27.67	24.9
1992	6	7.97	1.43 - 15.94	30.0
1993	5	6.50	0.48 - 13.23	26.3
1994	7	8.01	2.03 - 16.60	25.3
1995	6	8.42	0.78 - 19.02	26.9
1996	6	21.29	3.38 - 34.11	22.2
1997	6	10.60	2.73 - 20.61	22.7
1998	5	8.13	1.13 - 17.97	32.1
1999	5	8.34	2.59 - 16.54	30.8
2000	5	9.98	2.33 - 19.86	27.1
2001	7	20.99	4.88 - 35.99	25.1
2002	6	27.46	4.46 - 64.67	27.9
2003	6	23.36	2.17 - 57.31	23.7
2004	6	29.11	6.84 - 46.08	27.9
2005	5	29.35	7.28 - 45.62	29.8
2006	4	10.83**	0.73 - 20.66**	35.1
2007	5	28.72	1.22 - 62.50	25.1

* Average Low Temperature in Fayetteville during January according to NOAA data. NOAA data indicate that January is, on average, the coldest month of the year.
**2006 was a partial year running from April through Dec.

Summary

High propane prices have poultry producers struggling to keep their farms in operation. Some are questioning whether recent expensive renovations are saving or costing money. Every operation is unique, making that a difficult question to answer. It depends on each individual producer's unique situation (farm location, energy costs, integrator incentives and management style). During 2007, the ABRF paid the highest price in the farm's history for both gas and electricity. However, integrator incentives to renovate offset some of those higher costs. Electricity cost increased from 5.04% to 5.26% while gas cost decreased from 26.34% to 21.77% of the settlement check after renovation compared to the previous 5-yr period. Limited data exists for the post-renovation period and these figures will likely change with time. Caution should be taken not to read more into the data than is actually there at this early stage.

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Jim Plyler, Consultant, Turkey Health & Specialties, LLC., and
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Gut Health - Is Anything More Important in Turkey Production?

...prevention of gut enteric challenges can result in significant savings

Introduction

Gut health challenges are a significant and costly issue for turkey live production. Thanks to the power of genetic selection, the commercial turkey has undergone dramatic improvements in growth and feed efficiency. Unfortunately the new and improved turkey remains vulnerable to enteric diseases such as enterovirus, astrovirus, corona virus, reovirus, rotavirus and other unnamed viruses, not to mention the bacterial challenges (*E. coli, Salmonella* and *Clostridium*) and protozoal issues (coccidia*, Hexamita, Trichomonas, Cochlosoma and* cryptosporidia). And with feed costs increasing, even one point lost in feed conversion is an economic challenge. Gut health issues can result in loss of feed conversion, uniformity, weight, rate of gain, and higher condemnation rates. Therefore, prevention of gut enteric challenges can result in significant savings. By reviewing the stages of development and identifying areas in the production process that are crucial to optimizing gut health, the modern turkey producer can make sound management decisions that support the bottom line, a profitable business.

Management of Breeders and Eggs

Optimizing gut health begins before the producer ever receives the poults. The 28 day incubation process at the hatchery is actually the first weeks of life for the poult with the poult being 4 weeks old when he arrives at the brooder barn. Poult quality and health status is greatly influenced by the nutrients and antibodies the poult receives from the egg yolk. The benefit the poult receives from the egg will be dependent on the hen's nutritional and immune status. Therefore, the first crucial step in minimizing enteric challenges is proper management of the breeder bird. If not treated properly, bacterial infections in breeder birds can be the start of enteric issues in poults. Poults need to be free of *Salmonella, Pseudomona*s and *Clostridium* at hatch. A sound breeder program will focus on breeder nutrition, breeder management, breeder vaccination programs (including serological monitoring to check titers) and preventing disease challenges

. To assure the egg is not compromised, there should be a consistent program for egg handling, sanitation and holding. It is beneficial to set eggs according to length of storage time and egg size as well as flock age and vaccination program for breeders. This approach allows a more uniform hatch of poults similar in size and immune backgrounds. Close monitoring of incubation temperature, humidity and pull time along with a thorough understanding of equipment capabilities including the delivery truck will help minimize poor uniformity in poults delivered to the farm. Remember, most stress in poults occurs as a result of dehydration due to overheating. In addition, fewer lethargic poults will arrive at the farm if hot or cold spots in the delivery truck are minimized.

Barn Clean-Out Programs

The producer needs to have plenty of true down time between flocks and must utilize this time wisely. A good clean-out program will include sweeping the floor after litter is removed; a thorough wash down before disinfection; use of soap and disinfectants that are compatible; and after disinfection of the barn, application of a litter amendment to the floor to kill bacteria that can not be sanitized in dirt. Also important are good programs for darkling beetle, fly, rodent, varmint and wild bird control. Good clean-out programs are non-negotiable in defeating enteric challenges. In addition, the ground outside of the barn, particularly around the exhaust fans and near the doors where equipment and personnel enter and exit, must be treated. Once areas in and around barns are clean, maintaining a strict biosecurity program is the only option for maintaining sanitation. This includes keeping the barn doors closed even when the houses are empty.

Being Ready for Poult Arrival

Once the poults arrive on the farm, the producer, service technician, nutritionist, and veterinarian all become responsible for the success or failure of gut health. A good poult assessment upon arrival is paramount. This assessment can help the producer to know immediately if poults are stressed and need extra attention. Less than desirable poults can be managed into a successful flock but, only with strong management intensity

Poults never recover from a poor start. Before the poults arrive, the barn should be ready (feed and water in place and accessible; ventilation system and heaters working). The producer should also have adequate help for quick poult placement. Make sure the litter is warm, but not hot. It is much easier to warm the birds a little more if necessary, than it is to cool them down. If a poult is over heated or dehydrated, whether in the hatchery, truck or farm, the damages are often irreversible. Birds that have been slightly chilled can be warmed and in most cases things are fine. BUT this does not mean use NO heat!!! The bird will let you know if it is comfortable or too hot or cold. Loud screaming, running, pacing, or huddling poults will tell the story. If poults aren't happy, there should be a sense of urgency about correcting the problem. Staying focused on the flock's needs for the first 4 weeks of their life can almost guarantee success.

The quicker poults find feed and water, the faster their digestive tract will begin to function normally. Proper, consistent lighting program and intensity will help with feed and water consumption. Proper feed presentation (including correct feeder height and feed depth adjustments) is important for assuring that poults eat feed. Use of hydrated feed attractants such as Oasis or Early Bird will also encourage poults to eat and stimulate their appetite. If poults are dehydrated, make sure the feed attractant is well hydrated, but only use a little on the feed. The goal is to have birds clean up attractants quickly. Putting out more than they will eat in a few hours may cause the underlying feed to mold leading to crop mycosis. If gut health issues have been a consistent farm problem, consider using disposable feed trays for a couple of flocks to help break the cycle. NEVER RUN OUT OF WATER OR FEED!!! Dehydrated birds don't eat and birds without feed eat litter. Eating litter can cause birds to consume significant bacterial, viral or protozoal challenges, which could lead to enteric issues.

Water Sanitation and Management

Utilize a thorough water line flush and line cleaning with a proven water system disinfectant between flocks. Since slow water flow during brooding promotes warm water and potentially microbial growth in the system, these can lead to a biofilm in the water system which makes the lines 10 to 1000 times harder to clean. Without complete removal of biofilm or slime, problems may never be completely solved. By thoroughly cleaning the water lines before the birds arrive, it is possible to have a more consistent and effective daily water sanitation program when the birds are present. Invest in a double injection system so along with chlorine, a water acidifier can be injected to lower the pH thus allowing the chlorine in the bleach to work more quickly. Use target values at the end of the water line of 2-5 ppm free chlorine, a 6.0 to 7.0 pH and an ORP (oxidation reduction potential) of 750-850 mV. If supplemental water drinkers are used to start poults, make sure they are clean and filled with sanitized water on a daily basis or more often is even better.

Have the very best water sanitation program in place every day of the flock's life. Often producers get in a cycle of removing the water sanitizer in order to add products such as medications, vitamins and electrolytes. Remember proper use of antibiotic treatments is key in establishing optimum gut microflora. It is also important to remember that over use of water additives can promote bacterial growth and biofilm in the drinking water system which can contribute to gut health problems. While there are times when these products might be useful, a producer should think long and hard about using products that could compromise the quality of the water since turkeys will drink at least 2 pounds of water for every pound of feed consumed. One way to objectively test the theory about whether a water additive is helpful is to pay close attention to the quality of the bird droppings once the birds have been on a product for a few hours. If the droppings become

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loose and watery, the product should be removed and birds placed back on sanitized water. The use of copper based products is an exception to the rule. Periodic use of copper sulfate or copper proteinate products in the water can be beneficial for preventing crop mycosis, but droppings may be loose.

If poults are severely beak trimmed, it is critical that nipple drinker line pressure be minimized to enhance the poult's ability to drink. Use water meters to monitor water consumption to assure birds are always increasing their daily water intake. If water consumption drops or flat lines, birds are not well and a producer can respond before the issues become a disaster. If drinkers are different between the brood and finish barn, make sure some of the finish barn drinker types are placed in the brood barn before move so the birds will have adequate time to adjust to their new water supply.

Service Technician Role

The service technician plays an important role in the success of all aspects of a flock, but especially in the prevention of gut health issues. If pre-placement poultry house checks are utilized, many problems can be corrected or prevented before they become full blown disasters. Service technicians should perform a poult quality assessment at placement to help get the start off on the right foot and make necessary management adjustments. If the farm history is not good regarding disease challenges, then closely monitored "follow-up's" by service technicians will pay big dividends.
In addition, a thorough farm inventory on problem farms could reveal problems such as clogged or non-working drinkers and feeders.

In enteric disease situations, service technicians are often asked, "Is something missing from the feed?" Yet, most often feeds are exactly as formulated by the nutritionist and the real questions is "What caused these birds to eat litter and not feed?" Inadequate daily bird care or poor management are frequently involved in such situation and should be ruled out before looking for less obvious causes. Poor management issues could include improper ventilation (too much or too little), inadequate temperature control, excessive litter moisture, high levels of ammonia, distasteful water (due to too much sanitizer or microbial growth), poor feed presentation or any number of other issues.

Nutritionist Role

While the nutritionist plays an important role in establishing proper gut health, there are two kinds of poultry nutritionists, those that formulate forgiving diets and those who formulate bare essential diets that are unforgiving. It is important to realize that feeding low quality or marginal rations to the "new and improved" poult can potentially do irreversible damage. Since turkeys have the highest rate of gain early in life, they need nutrient dense diets that support the rapid growth rate. Feeding for least cost in the first two diets or approximately the first eight weeks can result in lost performance that is never regained. The first diets need good quality ingredients plus quality fat to make the feed palatable. There is some dispute that high fat diets (6-8%) are not well utilized by the very young poult, but the real benefit of fat may be that quality fat stimulates the poults appetite. The poult needs adequate levels of highly utilizable essential amino acids.

Laboratory assays of diets and ingredients will assist in assuring the correct quality and quantity of nutrients are present. Running regular mixer profiles to will confirm that mix time is adequate and that micro-ingredients such as coccidiostats are uniformly distributed in the feed. It is also important to know the quality of animal by-products in diets and determine if manufacturers treat their ingredient for *Clostridium*. It might even pay to test these ingredients on a routine basis for *Clostridium*.

Not only is a proper nutritional program critical, but a strong quality control program is a must to assure that quality ingredients are received and high quality feed produced. This is as important for macro ingredients such as corn, soybean, fat and animal proteins sources as it is for micro ingredients such as vitamins, amino acids, and trace minerals. It is also crucial to ensure that the feed mill delivers durable pellets and crumbles with a minimum amount of fines to encourage feed consumption. Properly formulated feeds are worthless if birds do not eat the feed as a complete meal.

Finally, the use of antibiotics for bacterial challenges is becoming limited so it is important to explore alternative options such as competitive exclusion or enzymes which aid the digestion of feed components. We must use any advantage to offset disease challenges.

Veterinarian Role

Keep the veterinarian involved to help determine if gut health issues are of bacterial, protozoal, or viral origin. It is important to know the poult source (history), the farm history and to use performance reports as your report card. You can also check finished feed samples, water samples and fecal droppings to help discover root causes of problems. If truth be told, higher intensity management may be the answer when previous performance has been poor. In addition, you can do your own postings of birds to determine if the flock is headed for a disaster or if things are okay. However, a good monitoring program (serology, histopathology, PCR, and periodic postings) along with a good laboratory and pathologist will often provide more definitive answers.

If gut health is an issue, pull a histological sample on every flock and submit to a laboratory with a good pathologist. This will tell the story. If there are still questions/issues, submit a fresh intestinal sample (placed on dry ice immediately) to your pathologist for virus isolation. When pulling guts for histological samples, it is important to randomly select the birds so that the sampling includes healthy as well as sick birds. It is also important to observe crop and gizzard contents when pulling gut samples. Note on lab submission form if litter was present because eating litter will often result in coccidiosis challenges and excessive mucus production in the gut, altering histological results. If the birds are full of litter this should be a critical warning sign that measures should be taken to draw birds back to feed either by top dressing feed with an attractant or hand running the feed line.

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Conclusion

One question that is frequently asked is: "What is missing from the feed?" Well if enteric issues are present, normally the missing component is their beak/mouth. A better question is: "What caused the bird to back off feed and eat litter?" The first step is to closely examine the daily care of the birds to identify poor management issues such as over or under ventilation, temperature swings, wet litter, ammonia, bad tasting water due to too much sanitizer or microbial growth, or poor feed presentation.

Dealing with enteric issues/gut health is a total team effort. All members of the team must fulfill their roles whether it is the breeder/hatchery mangers, the nutritionist, the veterinarian, the service technician or the producer. Strong, consistent programs must be implemented and followed to have good gut health! Preventing gut health disasters requires offense and defense particularly since many of the challenges are seasonal. Keeping good quality feed and water in front of the bird at all times is crucial as is daily monitoring feed and water consumption and growth rate. It is also important to have a strong sense of urgency about implementing corrective action and ensuring immediate follow through when issues arise is essential for success.

As the turkey continues to improve in growth rate and feed efficiency, it will be critical for everyone involved in bird management to stay in tune with how to rear this evolving bird. Even subtle changes in bird health, especially gut health, influence their livelihood. Cost to produce is still paramount with the company and producer, but when improving costs leads us astray of sound production practices, the results may be more costly. When enteric issues get the lead, they always win the race and you, the company and producer, are the losers.

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Runting-Stunting Syndrome in Broilers

Introduction

The microbial agents causing a number of intestinal diseases in young broilers have not yet been identified and such conditions are often called "viral enteritis" (Anonymous, 2008). However, agents causing similar signs in young birds have been reported around the world and have been called runting stunting syndrome (RSS), malabsorption syndrome, brittle bone disease, infectious proventriculitis, helicopter disease and pale bird syndrome (Rebel et al., 2006)

Runting-stunting syndrome (RSS) was first reported in the 1940's, became well known to the commercial industry in the 1970's and has since been reported around the world (Rebel et al. 2006). RSS continues to cause economic hardship in the broiler industry through decreased body weights, elevated feed conversions, reduced uniformity, reduced livability, plant downgrades and secondary diseases (Anonymous, 2008; Zavala and Barbosa, 2006).

Recognizing Runting Stunting

While symptoms of RSS can vary dramatically, birds are generally affected by RSS early in life with symptoms and mortality peaking at about 11 days. After placement RSS affected birds may huddle around feeders and waterers, or may persistently peck at the walls. Feed consumption is often depressed. A sizable proportion of the flock may be involved and while affected birds that are not culled may not die, they never recover. Often flock mortality is unaffected, but flock uniformity which normally runs about 70% decreases to about 35%. As

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feathers appear on affected birds, they are smaller than normal and may be curled especially at the wing tips (helicopter disease) (Zavala, 2006). The legs and beak of affected birds may appear pale in color (pale bird syndrome) and some birds may have rickets or broken legs (brittle bone disease) (Rebel et al., 2006).

When diseased birds are necropsied, the livers are generally small, but gall bladders are enlarged. Intestines are thin and translucent with large amounts of fluids along with poorly digested feed present in the lumen (Zavala, 2006). Intestines of affected birds may appear enlarged whereas the stomachs (proventriculi) may appear inflamed (Shapiro et al., 1998, Guy, 1998). The normal intestinal growth of the jejunum (the portion of the intestine where much of the digestion and nutrient absorption takes place) is interrupted by RSS (Esmail, 1988; Rebel et al, 2006). Pancreases from diseased birds degenerate and digestive enzymes are reduced. Droppings from affected birds are unusually loose, vents are soiled and litter may become damp, enhancing the possibility of secondary infections (Zavala, 2006; Zavala and Sellers, 2005).

What causes Runting Stunting Syndrome?

Researchers have not reproduced all the field symptoms of RSS experimentally and believe that several viruses, bacteria and other pathogens may be involved. Reovirus was originally thought to be the cause of RSS, but adenovirus, enterovirus, rotavirus, parvovirus and others may also be involved. Bacteria often isolated from RSS birds (*E. coli, Proteus micabilis, Enterococcus faecium, Staphylococcus cohnii, Clostridium perfringes, Bacteroides fragilis and Bacillus licheniformis*) are commonly found in the intestinal tract and may cause secondary infections, aggravating the initial lesions (Rebel et al., 2006). Brooding at cool temperatures tends to worsen RSS symptoms, as does short down-time between flocks. Certain strains of birds appear to be more susceptible to the effects of RSS than others and male birds are more severely affected than females (Zavala and Barbosa, 2006). However, it is interesting to note that researchers have found that resistant broiler strains have stronger immunological responses than susceptible strains. This difference is particularly pronounced when gut immunity is compared (Rebel et al., 2006). Some researchers have suggested that the poor growth and retarded feathering (which are consistently observed in RSS cases) are due to a common underlying infection, while virtually all other symptoms result from other infections or management factors.

Controlling Runting Stunting Syndrome

RSS often appears suddenly and disappears equally suddenly, making it difficult to determine effective control measures. However, it is important to remember that RSS is a disease of young birds with symptoms and mortality peaking at about 11 days so control efforts should be focused early in the life of the flock. Control efforts should focus in three primary areas: Biosecurity, good poultry house management and vaccination.

When RSS is reported in an area, it is important for the industry in the area to tighten Biosecurity procedures to reduce the possibility of exposure and to slow the spread of the disease. It is particularly important to emphasize procedures that control farm visitors, properly manage disposal of mortality and limit vermin infestations (rodents, wild birds and insects).

The objective of proper poultry house management is to provide an environment for the birds that is virtually stress free. In RSS situations, poultry house management is doubly important. Good management starts before the birds arrive. A minimum of 12 days of downtime should be allowed between flocks. Since litter has been shown to transmit the disease, it should be removed if birds have broken with RSS. If it is not possible to remove the litter, heat the litter to 100°F for 100 hours or compost the litter in the poultry house to lessen the possibility of passing the disease to the next flock via litter. The brood chamber should be cleaned and disinfected as thoroughly as possible prior to chick placement. Since low brooding temperatures have been shown to worsen the effects of RSS, DO NOT reduce brooding temperatures to save fuel. Check on birds often and maintain a house environment that is as stress free as possible. Remove dead birds quickly and cull severely if RSS breaks. The application of vinegar or other acidifiers via water may reduce spread of the disease. Supplemental vitamins and minerals in both breeder and broiler feeds has also been shown to improve immunity in chicks and their ability to deal with RSS.

Certain strains of reovirus (e.g. 1733 and 2408) were originally implicated as the cause of RSS and vaccines have been developed for such strains. While vaccination of broilers for RSS may be effective about 50% of the time, a consistent vaccination program for breeders often provides long term benefits (Shane, 2008, van der Heide, 2000). RSS vaccination programs for breeders generally provide protection for adult birds, reducing the possibility of spread to young birds. In addition, immunity in breeder hes is passed to chicks, helping to protect them from the disease.

Summary:

Runting stunting syndrome (RSS) has caused economic losses in the poultry industry for over three decades. While the reovirus was originally thought to cause RSS, further research has shown that other viruses and bacteria are likely involved. Control of RSS involves Biosecurity, good poultry house management and vaccination.

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Weighing Broiler Breeder Females Post Feeding

Introduction

Obtaining accurate body weights is a critical part of the process of rearing replacement broiler breeder pullets and managing breeder hens and males. From the first few weeks of age in the pullet house, all feed allocations are determined by the bird's weekly weight gains. Obtaining accurate body weights is very important to maintaining uniformity, body conformation and the overall development of pullets and young cockerels. Research has shown that accurately and uniformly controlling body weight of both replacement breeders and breeders in the hen house will result in improved performance parameters.

In the United States, the majority of poultry integrators rear pullets on some version of a skip-a-day feed program in order to control body weight among all the birds in a house. Under our current housing conditions, skip-a-day feed programs are the best way to uniformly distribute feed to all birds simultaneously in an effort to maintain body weight uniformity. However, the presence of feed in the crop or digestive tract will inflate the actual body weight of the birds and skew feed allotments. Therefore, replacement breeders are typically weighed on off feed days to normalize the data and not confound body weights with either the presence or absence of feed in the crop or digestive tract. This allows for body weight measurements to be consistent from week to week without regard for feed clean up time and the presence or absence of feed in the crop. Therefore, each week pullets and cockerels are weighed with an empty crop and digestive tract. This process continues until birds are moved to the hen house and feeding begins on an everyday basis. These weights are considered to be 'empty' weights.

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In the hen house, most commercial producers move from a skip-a-day to an everyday feed program as hens are brought into production. Feed is often provided daily in the early morning hours shortly after the lights are turned on. While feeding hens everyday in the hen house has proven to be an effective management tool, birds cannot be weighed on 'off feed' days. This has led to the concern over whether hen weights are truly reflective of the actually body weight and mass. Consequently, current industry recommendations are designed to address this issue and suggest producers weigh breeders late in the afternoon hours to obtain the 'empty' weights. This allows any feed consumed to have time to pass through the birds digestive system and therefore create an 'empty' weight situation for weighing purposes. In breeders this can be further complicated by the fact that the majority of egg production occurs in the morning hours following feed cleanup which would result in additionally body weight loss.

To address this issue, a research project was designed to weigh breeders at various intervals during the day to determine the best time to weigh birds to most accurately reflect actual body weight gains.

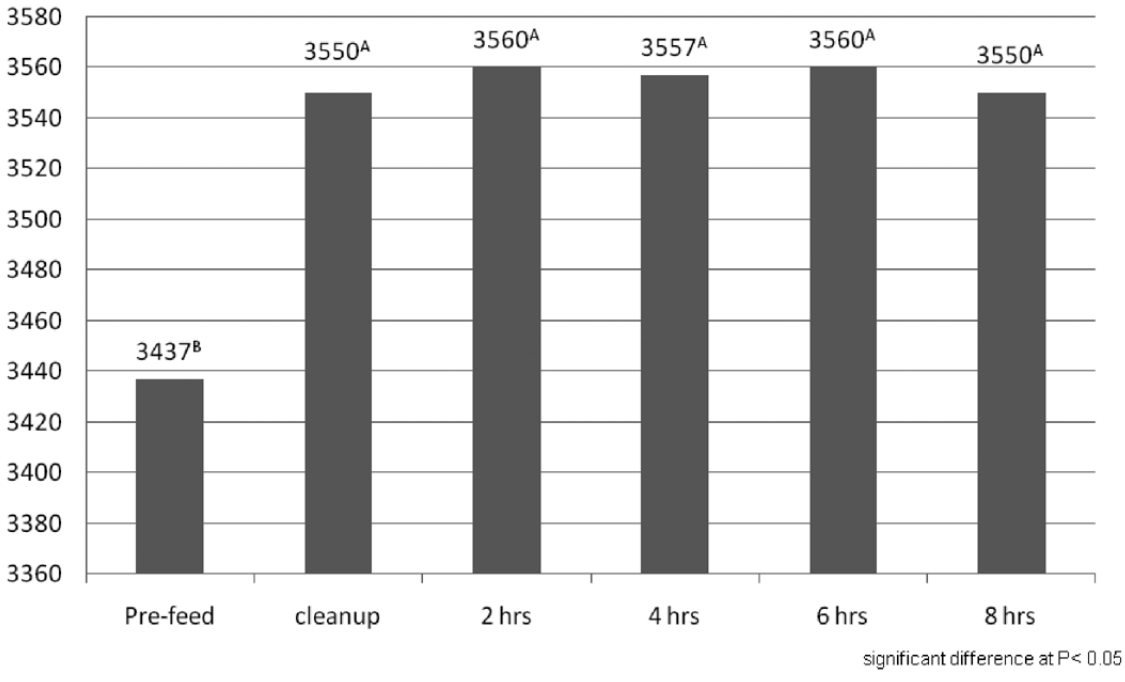
When to weigh breeders

Birds used in this study were housed at the University of Arkansas Broiler Breeder Research Farm. A single pen of breeders containing 71 hens was used for this study and during each weigh period all hens were corralled in a catch pen with each hen weighed individually so that no sampling error could affect the results. All hens were weighed prior to daily feeding and again at feed cleanup time. Additional bird weights were obtained at 2, 4, 6, 8 and 10 hours following feed cleanup. This process took place on the same birds at 24, 28, 34 and 41 weeks of age. These age periods represented pre-laying, pre-peak, peak and post peak in production stages of life.

Weight data from the 41 week old birds are displayed in Figure 1 and show no significant differences in body weight at any time period after feed cleanup through 10 hours after feed is consumed. Data from each of the other ages (24, 28 and 34 weeks of age) reflect the same patterns and trends with no significant differences detected between time intervals following feed cleanup time. It was previously believed that hens would lose body weight throughout the day to approach the 'empty' weights found prior to feeding. However, these data make it apparent that the passing of feed and the consumption of water appear to offset each other and allow the hen to maintain a near constant body weight through 10 hours following feed cleanup. Body weights obtained prior to feeding would be the only weights that could be considered 'empty' weights as they were obtained immediately after lights came on in the morning and are a reflection of body weight loss due to feed and water passage occurring during the dark hours.

These results would allow breeder service techs to weigh breeders in the hen house at any time following feed cleanup and that the data would be consistent with body weights obtained at any time throughout the day. These data will allow technicians to be more productive in a given day in regards to scheduling weighing of breeders in the hen house.

Figure 1. Average hen body weights (g) at 41 weeks of age.



How to weigh birds

When weighing birds, it is often recommended to weigh all birds caught in a catch pen and not weigh a specific number of birds to meet a given criteria. This has been the recommendation for broilers in research trials but has not been evaluated in replacement pullets and breeders. As part of this project, body weights were recorded for each hen in the order they were caught in the catch pen. For each age group and for each time interval previously mentioned, this resulted in 40 incidences of weighing all birds in a catch pen. Data presented in Figure 2 is a summary of all the data obtained from this project and shows that the last birds caught in a catch pen are significantly lighter weight than the first birds caught. This data supports that found with broilers in research trials and demonstrates the importance of weighing all birds in a catch pen.

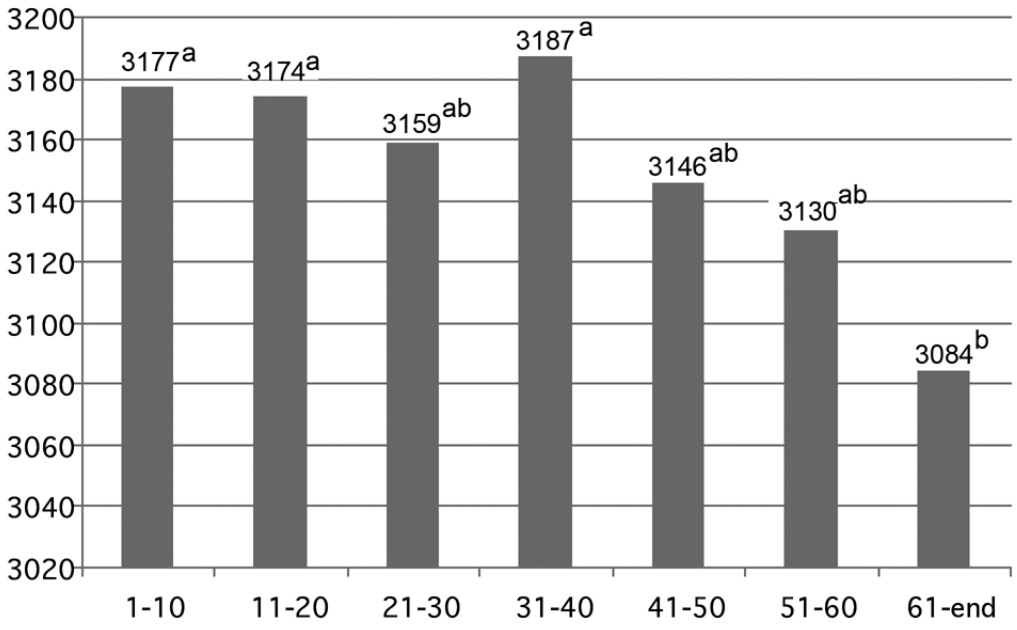
For instance, if 60 birds are caught in a catch pen and only the first 50 are weighed because that meets the minimum number needed then the body weight recorded would not be reflective of the actually weight of the birds caught or the birds in the flock. If this occurs with pullets and feed allotments are determined based upon these body weights then inaccurate feed allotments could be provided and less control over flock body weight would be the result.

Summary

1. When weighing broiler breeders in the hen house, accurate and consistent body weights can be achieved by weighing birds at any time after feed cleanup. There is no advantage to waiting for feed passage in an attempt to obtain 'empty' weights in breeders during the afternoon hours.

2. When weighing birds caught in catch pens it is important to weigh all birds caught in the pen and not stop at a predetermined number of birds. The last birds caught will be the smallest birds and need to be included in the final group weight to most accurately determine the average body weight of the birds in a flock.

Figure 2. Average body weights (g) by order birds were caught.



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