

North Carolina Poultry Industry Joint Area Newsletter

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Lost in Translation

Poultry products account for approximately 16% of the mean estimated 76 million of cases of foodborne illness and 25% of 325,000 hospitalizations in the United States making it a high need area for interventions (Hoffman et al., 2006). Employee actions are a critical component in determining the presence and levels of pathogens in poultry. Placards are typically used around the facility as reminders of appropriate procedures or to identify important practices to prevent the spread of pathogenic organisms by employees. In order for these methods to be effective, all employees must be reached with appropriate information.

Many industries face the challenge of employing a large percentage of individuals who might not speak English, are limited English-speaking, low literacy, might be recent immigrants and/or have little to no inherent knowledge about best management practices. Simple translation from one language to another is not always an effective means of communicating information. Many words cannot be translated because the word or the concept might not exist in another language or there might be two meanings for a word in one language but not in the other. Often individuals who translate are language proficient but not technically proficient. They might not have the technical vocabulary or technical expertise necessary to properly translate information. Many on-line programs for translation in addition to being poor grammatically also fall short in this category.

Another issue related to translation is even within a particular language there are different words or translations based on regional location just like there are different dialects and euphemisms in the U.S. Furthermore, just because one speaks a language does
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LT Litter and House Treatment Policy

Donna K. Carver, Extension Poultry Veterinarian, Poultry Science, NC State University

As litter cleanout season is rapidly approaching, it might be a good time to review NCDA's regulations regarding litter from Laryngotracheitis (LT) positive and LT vaccinated farms. If your farm is LT positive or LT vaccinated the following rules apply. If your farm is not presently LT positive or vaccinated for LT please remember to avoid visiting or sharing equipment with farms currently under restrictions.

LT Litter and House Treatment Policy CEO Vaccinated Broiler Farms and ILT Positive Farms Revised 1-17-08

GENERAL

1. Restrict traffic and people from entering your farm. No unnecessary visitors should be allowed.
2. Do not share equipment or help friends on other farms.
3. Birds may not move off a farm under quarantine without permission from NCDA&CS.
4. You must dispose of dead birds on your premise if under quarantine.

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LT Litter and House Treatment Policy

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LITTER MANAGEMENT – ILT POSITIVE FARMS

1. After birds are loaded for slaughter, follow your company rules for house heating and/or closure. NCDA&CS recommends heating house to 100 degrees F for 2-3 days and keeping closed for 14 days before placing a new flock. [During this closed house time, you will get better heating of your litter if you move litter into windrows 2.5 to 4 feet deep. If the litter heats to greater than 135 degrees F and stays that high for 5 days (measure heat with probe thermometer), most viruses will be killed.]
2. After 14 days, you may move litter to shed to undergo another heating cycle for 5 days.
3. Litter may be moved off the premise after two heat cycles as long as it remains within the vaccination zone area.

If you have questions or need further information, please contact me at (919) 515-5526 or Sarah J. Mason at (919) 609-2644.

Lost in Translation

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not mean that they read or write it. To help alleviate these issues have a bi-lingual individual familiar with the technical vocabulary of your facility, who is familiar with the culture of the foreign speaking individuals that the messages are intended for, review intended message content of facility signage. It is best to ensure that all placards in and around your facility also include a pictorial or animated description of the message being conveyed for those with limited literacy.

Hoffman, S., P. Fischbeck, A. Krupnick and M. McWilliams. (2007). Using expert elicitation to link foodborne illness in the United States to foods. J of Food Prot. 70(5) 1220-1229.

Infectious Laryngotracheitis Virus (ILT)

(Donna K. Carver, DVM, PhD, ACPV)

What is ILT?

Infectious Laryngotracheitis virus is a herpes virus that causes respiratory disease in chickens. ILT is a reportable disease in North Carolina and some other states. Flocks suspected of having ILT must be reported to the North Carolina Department of Agriculture and Consumer Services' (NCDA&CS) Veterinary Division.

Where does ILT come from?

Though ILT can be found in chickens throughout the world, it does not survive for extended periods outside the bird in the environment. ILT is susceptible to sunlight and most commonly-used disinfectants. Once infected, chickens become life-long carriers of ILT and can shed the virus during times of stress. Chickens are considered to be the source of infection for other chickens. Virus can be transmitted over short periods of time on equipment, boots and coveralls.

What clinical signs are present in ILT-infected birds?

Birds infected with ILT initially exhibit signs similar to other respiratory diseases, including: wet irritated eyes (Fig.1), sneezing, nasal discharge, failure to thrive, decreased growth, and decreased egg production. As ILT progresses the clinical signs may become much worse including: difficulty breathing, bloody discharge from the nose and mouth, gasping (Fig.2), coughing, and expectoration of bloody mucus. Birds will shake their heads to clear the mucus from their nose and mouth, which results in blood stained mucus on the feathers of many birds in the flock.



Figure 1. Wet irritated eyes

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Infectious Laryngotracheitis Virus (ILT)

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Figure 2. Open-mouth breathing or gasping

How long does ILT last?

The course of the disease varies with the severity of the lesions, but most birds recover in 10-14 days.

Will my birds die from ILT?

Again, the severity of the lesions is related to the mortality seen in flocks with ILT. Mild forms of the disease result in very low mortality (0.1-2%). Severe forms of the disease result in variable mortality (5-70%) with average being 10-20%.

How is ILT diagnosed?

In ILT infections, clinical signs alone should make you highly suspicious that you are dealing with ILT. Even so, as with any disease, you should submit birds to the diagnostic laboratory in your area for confirmation of the diagnosis. A post-mortem examination of affected birds will generally reveal blood in the bird's airway. The trachea or windpipe is often very bloody and may be partially clogged with mucus and blood (Fig. 3). Swabs of the trachea will be used to attempt to grow the virus. Other diagnostic tests may be performed to confirm that your flock has ILT.



Figure 3. Trachea filled with blood and mucus

What happens if my flock has ILT?

If you live in North Carolina, where ILT is a reportable disease, your farm will be quarantined by the NCDA&CS. A quarantine means that you must have a permit to move birds onto or off your farm until the quarantine is lifted. Your birds will be sent to market as quickly as possible with travel to market via routes determined by the Department of Agriculture. Lifting of the quarantine is accomplished when your farm tests negative for ILT two times in a row with the tests being performed thirty days apart. Before the first of these tests, your farm must be cleaned and disinfected.

In some cases the NCDA&CS will permit flocks in close proximity to LT-positive farms. Vaccines are administered under permit and vaccinated farms are quarantined to restrict movement onto and off of vaccinated farms. Because vaccinated birds can transmit LT these flocks are treated the same as positive flocks.

How do I handle litter from LT-positive and LT-vaccinated farms?

General

1. Restrict traffic and people from entering your farm. No unnecessary visitors should be allowed.
2. Do not share equipment or help friends on other farms.
3. Birds may not move off a farm under quarantine without permission from NCDA&CS.
4. You must dispose of dead birds on your premise if under quarantine.

Litter Management-Vaccinated Farms

1. After birds are loaded for slaughter, follow your company rules for house heating and/or closure.
2. Litter may be spread on your farm or moved off farm to spread elsewhere within the zone where vaccination is taking place.

Litter Management-ILT Positive Farms

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Infectious Laryngotracheitis Virus (ILT)

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2. After 14 days, you may move litter to shed to undergo another heating cycle for 5 days.
3. Litter may be moved off the premise after two heat cycles as long as it remains within the vaccination zone area.

Can people get ILT?

No, human health is not affected by ILT.

Is it safe to eat meat and eggs from birds with ILT?

Yes, because humans are not affected by ILT, and because the virus is destroyed by cooking, it is safe to eat poultry products from infected birds.

How can I prevent ILT from infecting my flock?

Preventing the introduction of ILT and other viruses onto your farm should be the goal of all producers. Preventing the introduction of ILT into your flock is not difficult to do if you follow some "common sense" guidelines.

- **Avoid moving any birds onto or off your farm during an ILT outbreak.**
- **Do not visit other poultry producers during an ILT outbreak.**

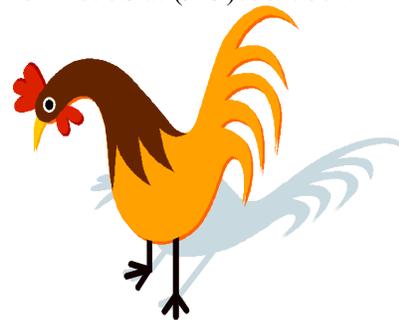
Dr. Bob Hillman, Executive Director of the Texas Animal Health Commission recommends simple biosecurity measures that can be taken to help protect flocks:

1. **"Keep a spare pair."** Buy a pair of inexpensive rubber boots, and wear them only on your own premises, to avoid 'tracking in' disease.
2. **"Give germs the brush off!"** Use a long-handled brush to scrape off manure, mud or debris from tires, equipment or boots, then disinfect.
3. **"Disinfection prevents infection!"** Mix a solution of three parts bleach to two parts water, and use it liberally to clean rubber boots and equipment brought onto your farm. If visitors don't want their vehicle

tires sprayed with disinfectant, ask them to park outside your gate.

4. **"Make visitors take cover."** Don't be shy about asking visitors to disinfect their footwear -- or better yet, provide guests with disposable shoe covers, or footwear worn only on your place.

If you live in North Carolina and think your flock has ILT, call NCDA&CS at (919)733-7601.



Understanding the Physiology of Lighting for Broiler Breeders

(Mike Wineland, Departmental Extension Leader, Poultry Science, NC State University)

Manipulation of the light environment for the bird can **optimize reproductive function, alter behavior, metabolic rate or physical activity.** Lighting programs are quite different for pullets and hens, however there are a number of concepts of light utilized by both which are shared. Reception of light by the pullet for reproductive purposes is not primarily through the eyes but rather by a part of the brain termed an extraretinal receptor (a receptor not in the eye). The light energy (photons) will penetrate the skull, skin and feathers to reach this receptor. The ability to penetrate to the extraretinal receptors is a function of the intensity and wavelength of the light source.

The pullet must be **prepared** for lay in the pullet house and **allowed** to become and then be capable of maintaining sexually maturity in the breeder house. The pullet must be able to interpret daylength. The bird has been shown to interpret daylength by the occurrence or lack of occurrence of light during an "photosensitive period" which occurs 11-16 hours after dawn in a 24 hour day. The pullet perceives a long day if after a "dawn" or lights on, she then subsequently perceives light during the photosensitive period. If no light is perceived during this photosensitive period, the bird interprets the day as a short day similar to what we experience in winter time

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Physiology of Lighting for Broiler Breeders

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in the U.S. The pullet will be properly prepared if she receives at least 8 weeks of short daylengths of 8 hours just prior to moving to the breeder house. Generally she will be on short day for a much longer period in the pullet house so as to help control activity and proper weight gain. Problems may arise if someone turns lights on when they should not be turned on or if there are light leaks in a blackout house when lights are off but occurring during a normal long day such as experienced during the summer months. This is why it is essential to have good blackout conditions in the pullet house.

In the breeder house the hen is stimulated with long days to initiate development of the ovary and reproductive tract. The long days are perceived during that "photosensitive period" occurring 11-16 hours after dawn as described above. If the hen has been properly sensitized so as to be capable of responding to the long daylengths and she is physically ready with regards to age and body condition she will commence production quickly. The hen's egg production will climb to a peak production rate and then gradually decline as she ages in the breeder house. The reason for this is that at the same time she is being photostimulated by long daylengths she is also starting to become photorefractory. Photorefractory is the condition where the hen responds less and less to the stimulatory long daylengths we have given her in the breeder house. Photorefractoriness is attained extremely slow compared to the photostimulation process. This results in the gradual decrease in egg production. The rate at which she becomes photorefractory can be manipulated by the daylength she receives in the breeder house. The longer the daylength, the more rapid the onset of the photorefractory condition and reduced egg production. Shorter, but still photostimulatory daylengths will allow the photorefractory condition to be attained slower and thus keeping the hen in production longer.

Managing the lights for breeder is a very complicated process. Thus it is important that the pullet and hen be properly managed and the house conditions be optimal to obtain good egg production.

In a future article we will discuss lighting for broilers.

Feed Mill Education Unit Grant Opening



The Grand Opening of the Feed Mill Educational Unit located at the University Field Labs on Lake Wheeler Road took place on October 31st, 2007. University administrators, faculty, staff, students, and industry representatives gathered to celebrate the opening of the new facility.

The feed mill will support the extension, research, and teaching efforts of the *Departments of Poultry Science, Animal Science, and Biological and Agricultural Engineering*. The Feed Mill focuses on teaching, developing, and implementing new technology associated with feed milling and animal agriculture in North Carolina.

The feed mill will provide research feed to the animal production units located at the University Field Labs while allowing students the an opportunity to learn

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Feed Mill Education Unit Grant Opening

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how to operate a modern automated feed mill. The feed mill will also provide North Carolina feed, allied, and animal industries the opportunity to test and develop new products in both a research and commercial operation. Extension programs and short courses in feed manufacturing and quality assurance will be offered at the feed mill to individuals throughout the state, nation, and world.

Currently we offer a course in "Feed Mill Management and Formulation" that can be taken on campus or through the distance education program at NC State.

For more information about the Feed Science Program at NC State contact Charles Stark at 919-515-5399 or by e-mail charles_stark@ncsu.edu.

*Charles Stark, Ph.D., Assistant Professor,
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Are you Preparing for Spring?

Edgar O. Oviedo-Rondón, DVM, Ph.D., Dip. ACPV
Assistant Professor/Extension Specialist
Department of Poultry Science, North Carolina State University

Severe weather most often occurs during the spring. The humidity normally increases during this period of the year. Fluctuating temperature and humidity bring some complications to normal poultry management and call for more attention to details. Broiler growers should prepare for the drastic changes in weather and possible storms. The purpose of this newsletter is to discuss three aspects of importance when preparing for the spring season.

The first one is related to more frequent cases of mold contamination and mycotoxicoses during spring. Fungi can grow faster under spring weather conditions in the feed and the litter. *Aspergillus* is the most common fungi in the wet litter and its spores can affect baby-chick lungs during the first days. *Aspergillus* can cause respiratory problems, neurological signs, stunting and increased first week mortality. Avoid using any wet litter or dry it well before placing chicks. Most fungi or molds produce mycotoxins. There are over 200 types of mycotoxins, but aflatoxins, ochratoxins and

fusarium toxicoses are the most frequent. Fungi can contaminate feed at the feed mill, the trucks and frequently in the feed bins at the farm when they have not been cleaned for a while. Make sure that your feed bin does not have any residues of old feed and the whole feeder line is clean for your next spring flock. Molds will definitely augment during this period of the year. Mycotoxins are responsible for decreased growth rate, feed conversion efficiency, and livability. Chickens exposed to mycotoxins through feed normally have lower immunity and vaccinations do not work as well. Due to the frequent outbreaks of Infectious Laryngotracheitis (LT) in the past months, it is important to maintain very good immunity in the birds. Problems with mycotoxins have been common in poultry production for several decades. In the mid 1970's, research conducted for NC State University under commercial conditions in North Carolina demonstrated that cleaning and decontaminating silos and feed systems improved broiler carcass grades by 25%, average broiler weights by 4%, feed conversion by 3%, over a control flock not subjected to decontamination. Feed bins and feeders normally accumulate feed leftovers from previous flocks. Now is the best time to clean them out well and in case of clear contamination use mold inhibitors available in the market. These products are mainly based on organic acid blends. Follow the label recommendations for application and handling of these products.

Ventilation is the second critical aspect that we want to discuss. Remember that relative humidity can be higher in the spring and ventilation rate may need to be increased earlier in the life of the flock during this season according to weather conditions. If you are concerned about saving gas during brooding by keeping low ventilation rates that maintain the heat in the house, keep in mind that house target temperatures can be gradually reduced from 92-93 °F at chick reception to have 82 °F at seven days of age. When you have good brooding during the first week, the average bird weight should be at least 165 grams or 0.36 pounds at seven days. Flocks with good brooding eat sufficient feed and produce enough metabolic heat as they grow. The optimum house temperatures for these good flocks are inferior to the ones needed for slow growing birds. Lower temperatures permit you to have more fan time and better air quality in the house. Try to avoid house relative humidity higher than 70%. If your house relative humidity is higher than 70%,

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Are you Preparing for Spring?

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you will have wet litter increasing ammonia production and causing foot pad problems in the broilers. Both factors affect negatively broiler performance and final results in the flock. To avoid extra humidity in the house place more attention to ventilation. You can improve ventilation by sealing up all air leaks that bring cold and humid air directly to the warm litter causing litter caking. Ventilation can also be improved by managing properly perimeter inlets, static pressure and using stirring fans.

Finally, some aspects of safety are important during the spring. Make sure to be prepared for power outages due to storms and more frequent lighting. Double check that your standby generator is working properly, and the farm wiring, the electrical grounding and lighting protection have no defects.

These are just three aspects in farm management that are more frequently affected during the spring. Get prepared to avoid any inconveniences during the best time of the year.

4-H Youth Activities

Melissa Taylor Scherpereel, Department of Poultry Science,
North Carolina State University

Turkey Show

Day old turkey poults will be distributed the first week of June from the poultry teaching unit off of Lake Wheeler Road in Raleigh. Please visit the turkey show section of our website,

<http://www.ces.ncsu.edu/depts/poulsci/4h/turkeyshow/turkeyshow.html> for exact dates and details on how to register. We will be limiting the number to 250 participants and registration is on a first come first serve basis. An online form is posted on the website and all information can be entered online. There will be NO poults available for “walk ups” and non-registered individuals.

Poultry Science Summer Institute

August 3 – 7, 2008

We have set the date for our next summer institute and will be posting an online registration form on our

website at <http://www.ces.ncsu.edu/depts/poulsci/4h/summerinstitute/institute.html>

Registration is limited to 20 rising 11th and 12th graders. We also have openings for two adults (teachers, agents, etc.). The application deadline is April 15th, 2008 and accepted applicants will be notified by May 1st. There is a \$50 registration fee that covers ALL costs for the conference and is due after acceptance. Please contact us if you have any questions. And as always, check our website for all of these youth programs and more at www.poultry4h.info or contact Melissa Scherpereel at 919-515-5403.

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Reducing Energy Use with Solar Transpired Walls in Poultry Houses

Sanjay Shah, BAE Dept., North Carolina State University
Bob McGuffey, North Carolina Solar Center

The Energy Information Administration reported that in North Carolina, wholesale propane prices increased by a whopping 67% to \$1.67/gallon in January 2008 compared to January 2007. However, it is not just the increase in price but the market uncertainty that makes decision making difficult. Propane prices largely depend on demand and though we had a relatively mild December 2007, we saw many colder-than-average days in January 2008. Since energy is a large part of poultry production cost, reducing energy use has the potential to somewhat cushion the effects of the volatile propane market.

The poultry industry has been watching this situation carefully and has been active in trying to reduce energy use through better maintenance and by adding insulation. Producers have made bigger investments to reduce energy use, such as, replacing the less efficient pancake brooders with the infrared tube heaters. The USDA can also help through the Renewable Energy and Energy Efficiency (REEE) Program. It can offer grants, guaranteed loans, and combination grant/guaranteed loans to animal producers to make energy efficiency improvements and install renewable energy generators. (For more details, go to: <http://www.rurdev.usda.gov/rbs/farbill/>). The USDA will fund solar energy projects because it is renewable and it also reduces air pollution by reducing the release of gases such as carbon dioxide. Furthermore, in NC, you can sell renewable energy to your electricity provider at \$0.21c/unit. You also get substantial federal and state tax credits when you make renewable energy investments. These factors have increased interest in using solar energy in animal houses.

Solar energy can be used in two ways to meet the energy needs of poultry houses, namely, (a) using photovoltaic (PV) cells and (b) using transpired walls. Using the PV method, solar energy is converted into electrical energy by PV cells on solar panels. A typical broiler house may need about 8 to 10 kW to meet the electrical energy demand and an array of PV cells may be able to meet a large portion of the demand most of the year. The PV method may cost \$45,000 to \$60,000 per house with paybacks of 5 to 9

years, after you include account federal and state tax breaks but without any USDA support. The shorter payback period is when you sell excess energy at \$0.21c/unit. Due to the high initial investment and relatively long payback with the PV method, many producers may be inclined to take a wait-and-watch approach. The lower cost transpired walls may be appealing to producers who are more interested in reducing heating costs.

Transpired walls have been used in industrial and commercial buildings in Canada, Germany, and even in North Carolina (Figure 1). The transpired wall consists of a dark-colored porous metal wall that is placed on the sunny side the house. When air is drawn through the minute holes in the transpired wall, which being a solar collector, will heat up the passing air. The US Dept. of Energy reports that the incoming air can be preheated by as much as 40°F though the actual heating will depend on the orientation of the wall (south facing wall is the best) and cloud cover. Figure 2 shows how the transpired wall works at the facility in Aberdeen, NC shown in Figure 1.

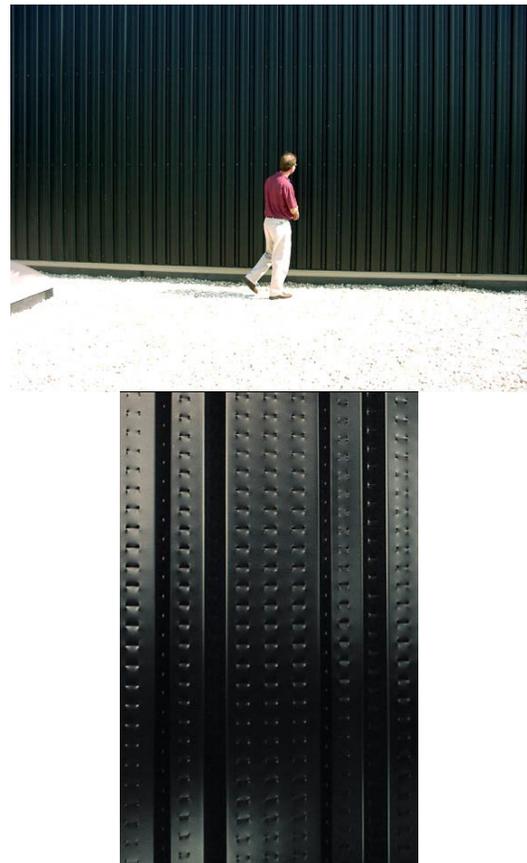


Figure 1. Transpired wall at INTEK in Aberdeen, NC. Close-up view of transpired wall shown on the right.

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Reducing Energy Use with Solar Transpired Walls in Poultry Houses

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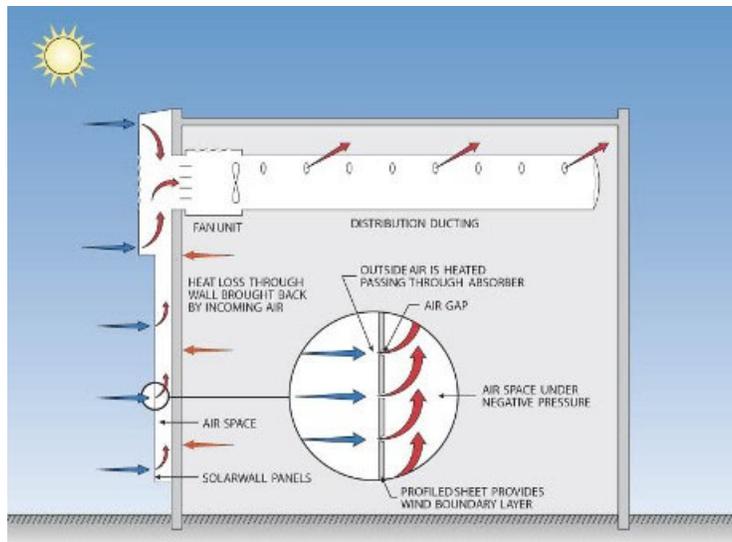


Figure 2. How the transpired wall works at the INTEK facility in Aberdeen, NC

It should not be too difficult to use the transpired wall in broiler or turkey brooder houses. It should be placed on the sunny side the house, in front of the ceiling or wall inlets (Figure 3). During brooding or in winter, when the minimum or mild weather fans come on opening the inlets, air drawn through the minute holes in the transpired wall will be heated up. Given that air inside the broiler house has to be heated up to 92-93°F during the first week of brooding, tempering the fresh air during daytime under clear skies can result in substantial energy saving. Tempering 1,000 cfm of fresh air at 50°F and 50% relative humidity to 80°F (30°F increase) using a transpired wall will save nearly 2 gallons of propane over a 5-hour sunlight duration. (For reference, a 36 in. fan will move 9,000-10,000 cfm at the house static pressure.) This tempered air is also drier (relative humidity of 18%) and will hence, be more effective in removing excess moisture from the poultry house. Further, reducing propane consumption by 2 gallons will also reduce carbon dioxide and water vapor buildup in the house by 15 and 10 lb, respectively, since these two compounds are formed when you burn propane. During nighttime in cool weather, the transpired wall will reduce heat losses from the house. Even in summer, when tunnel ventilation is being used, the transpired wall will reduce heat gain from the sun by shading the house walls. An important benefit of the

transpired wall is that maintenance is minimal since it has no moving or liquid components. However, it is important to prevent accumulation of dust and debris on the transpired wall which can reduce the ventilation rate.

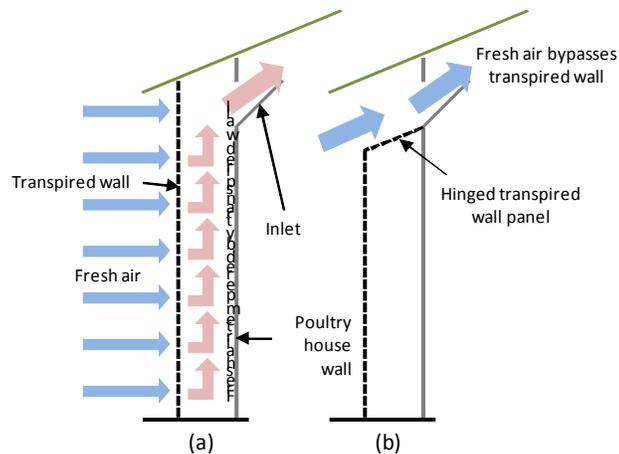


Figure 3. A view of a transpired wall. Figure 2(a) shows fresh air being tempered by the transpired wall and figure 3(b) shows the fresh air bypassing the transpired wall for mild weather ventilation.

However, transpired walls may not be for everyone. You need to consider the orientation of your poultry house. In the northern hemisphere, we get the most sunlight on the south side during winter and on the north side during the summer. So, where winter heating is important, a poultry house built along the east-west axis will allow you to install the transpired wall on the south, though southeast and southwest facing walls are also acceptable. In cooler western North Carolina, which has a large poultry industry, north facing transpired walls will help during summer brooding. The transpired wall will also reduce the ventilation rate by increasing static pressure; so, you will need to run your fans longer. While there are no studies done in poultry houses using transpired walls, your heat energy savings will likely offset your increased electricity use. Also, during transitional or mild ventilation (between minimum and tunnel ventilation), to prevent the fresh air from being tempered, a panel of the transpired wall could be hinged (Fig. 1), thus allowing the fresh air to bypass the transpired wall.

Recently, the North Carolina Solar Center did a study on installing transpired wall in a broiler house in eastern NC. The total cost of installing a transpired wall was \$11 per square foot with after tax payback

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Reducing Energy Use with Solar Transpired Walls in Poultry Houses

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period of 13-14 months, without any USDA support. As a start, a poultry producer could consider installing enough square footage of transpired wall on the south side that would cover half of the minimum ventilation rate provided by, say, two 36-in. fans (small birds and/or cold weather). The other half of the air would come from the north side that has no transpired wall. Since the two fans would require a total of 15-16 inlets, to cover the eight 44-in. inlets on the south side, you would need a total area of about 500 sq. ft. of transpired wall which would cost about \$5,500 per house. If the USDA were to provide a 25% grant, your cost would be correspondingly lower. Of course, you would also qualify for Federal and state tax credits for improving energy efficiency that would amount to more than 65% of the remaining cost. So, if your heating season is long, you raise smaller birds (i.e., you run more flocks through the house), and the orientation of your houses are favorable for installing transpired walls, you may want to give transpired walls serious thought.