

# North Carolina Poultry Industry Newsletter

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Issue Editor: Kathy Bunton, Area Specialized Agent

Issue Layout: Jane Duncan, Extension Secretary

Department of Poultry Science  
 234 D Scott Hall, Box 7608, NCSU  
 Raleigh, NC 27695-7608  
 Telephone: 919-515-5407  
 Fax: 919-515-7070  
 Website: <http://www.ncsupoultry.com>

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## IMPACT OF LITTER STORAGE ON POULTRY PESTS

Wes Watson and Mike Stringham  
 Department of Entomology, NCSU

Since regulatory agencies require land application of poultry litter during the growing season, it may be necessary to store litter until conditions are suitable. Litter storage treatments included covered storage area, ag-bag, white tarpaulin, black tarpaulin and conventional composting. Sampling the stored litter indicated darkling beetles survived in the ag bag treatments but not tarpaulin or compost and house flies survived covered storage. Stored litter was sampled weekly for 6 weeks. Litter was sampled by collecting approximately 100 ml of material from 5 locations. Collected litter was examined for live insects. Although mortalities were attributed to thermal cycling under tarps and within the compost bin, escaping insects were not accounted for in the sampling process.

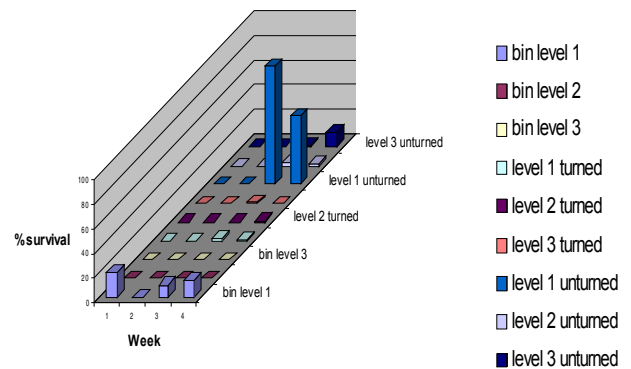
Sentinel insects were used to monitor the impact of storage on house fly and darkling beetle survival. Treatments included a conventional compost bin in which the contents were turned weekly. The second treatment was black tarpaulin covered litter and the litter piles were turned weekly. The third treatment was black tarpaulin covered litter and the litter was not turned weekly. Temperature data was collected every 30 minutes from thermal couples buried in the litter to depths of 1, 10 and 18 inches and designated as levels 1, 2 and 3, respectively (Figure 1).

Sentinel bags constructed from fiberglass window screen were filled with 30 house fly pupae, or 30 adult darkling beetles. Three house fly sentinel bags were fixed to a wooden dowel at lengths corresponding to levels 1, 2 and 3. The dowel was inserted into the litter pile with the thermal couple to measure temperature for each depth. Sentinel bags containing darkling beetles were also inserted into the pile. Sentinel bags were placed and recovered weekly for four weeks.

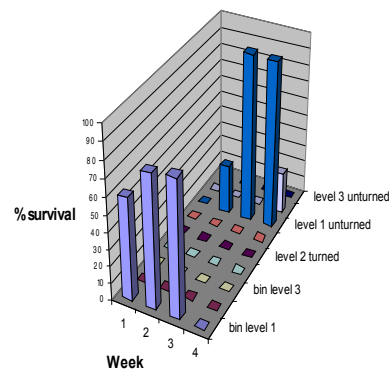
Mean ambient temperature during this four-week experiment was 58 °F. As expected four-week mean

temperature at depth levels 1, 2 and 3 in the compost bin was 60, 80, and 144 °F, respectively. Temperatures in unturned, tarpaulin covered litter were 77, 106 and 96° C for depths 1, 2 and 3, respectively. Lastly, 1, 10 and 18 inch depth temperatures in turned tarpaulin covered litter were 104, 129 and 110° C respectively. House fly pupae and adult darkling beetles survived the coolest temperatures at 1 inch depth in the compost bin and the unturned tarpaulin covered litter pile. During weeks 1, 2 and 3, house fly and darkling beetle survival was < 1% for the other treatments and depths. The thermal cycling process common in composting had decreased by week four, allowing more insects to survive. Covering litter with a tarpaulin decreases house fly and darkling beetle survival. Turning the litter pile weekly caused the litter to undergo lethal temperature changes killing most of the insects.

House flies: % survival in turned vs. unturned piles and a control (bin)



Darkling beetles: % survival in turned vs. unturned piles and a control (bin)



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**NEW PHOSPHORUS ASSESSMENT TOOL**

A.M. Johnson and D.L. Osmond  
 Department of Soil Science  
 NCSU

Both animal waste and fertilizers are a good source of nutrients for plant growth. There are, however, some major differences between the two sources. Commercial fertilizer can be blended to match soil test reports and the material is immediately available to crops, whereas animal waste is more slowly available to crops and, if applied on a N-rate basis, supplies 2 to 7 times more phosphorus than the crop needs. Many fields on which animal waste has been applied have very high soil test phosphorus levels. On a soil test report, very high soil test is anything above 100. Many fields receiving animal waste have anywhere between 2 to 25 times more phosphorus than needed to produce a crop.

As soil test phosphorus increases, the potential for the phosphorus to leave the field increases. Excess phosphorus can increase the chances of phosphorus reaching our surface waters. This excess phosphorus can lead to algal blooms, which impacts people and wildlife alike.

In response to strengthened nutrient management standards that require consideration of phosphorus, North Carolina has developed a site-specific phosphorus indexing system called the Phosphorus Loss Assessment Tool (PLAT) to predict relative amounts of potential phosphorus loss from agricultural fields (<http://www.soil.ncsu.edu/nmp/ncnmwg/>). Over a three-year period, state and federal agencies and personnel from NC State University developed this tool. The PLAT is currently being used on some swine spray fields.

Four loss pathways are recognized in PLAT: phosphorus that is attached to the soil and is lost due to erosion; phosphorus that is dissolved and leaves the field as runoff; phosphorus leaching through the soil; and phosphorus losses from sources such as commercial fertilizer and animal waste. All of these losses are added together into a final rating. If the rating is low or medium, waste can be applied at a nitrogen rate. A high rating limits waste applied to the amount that will supply crop phosphorus removal rates. For fields with a very high rating no more phosphorus can be applied.

We conducted a study to predict the percentage and types of farms that will need to change management practices due to implementation of the PLAT tool. Sites from all 100 counties in North Carolina were sampled, with the number of samples taken from each county depending on the proportion of the state's agricultural land that occurs in

that county. Results show that approximately 8% of producers throughout the state will be required to apply animal waste on a phosphorus basis rather than a nitrogen basis. Areas in which PLAT predicted the greatest amounts of phosphorus loss were sites in the Coastal Plain region of North Carolina and sites receiving poultry waste. Loss of phosphorus from dissolved pathways tended to be greater than other loss pathways. This is of concern, as no practices currently exist for the reduction of in-field dissolved phosphorus. The PLAT index predicted the areas in the state that are known to be disproportionately vulnerable to phosphorus loss due to histories of high phosphorus applications, high densities of animal units, or soil type and landscapes that are most susceptible to phosphorus loss.

**Contacts for the North Carolina Poultry Industry Newsletter**

**On-Campus Contact**

Brian W. Sheldon, Ph.D., Dept Extension Leader  
 Dept of Poultry Science, NCSU  
[www.ces.ncsu.edu/depts/poulsci/](http://www.ces.ncsu.edu/depts/poulsci/)  
 email: [brian\\_sheldon@ncsu.edu](mailto:brian_sheldon@ncsu.edu)  
 telephone: 919-515-5407

**Field Faculty Contacts**

Kathy Bunton, Area Specialized Agent, Poultry  
 \*Iredell, Wilkes and Alexander Counties  
[www.ces.ncsu.edu/iredell/](http://www.ces.ncsu.edu/iredell/)  
 email: [kathy\\_bunton@ncsu.edu](mailto:kathy_bunton@ncsu.edu)  
 telephone: 704-878-3154

Dan Campeau, Area Specialized Agent, Poultry  
 \*Chatham, Harnett, Lee, Moore and Randolph Counties  
[www.ces.ncsu.edu/chatham/](http://www.ces.ncsu.edu/chatham/)  
 email: [dan\\_campeau@ncsu.edu](mailto:dan_campeau@ncsu.edu)  
 telephone: 919-542-8202

James Cochran, Area Specialized Agent, Poultry  
 Bladen, Columbus, Cumberland, Hoke and \*Robeson Counties  
[www.ces.ncsu.edu/robeson/](http://www.ces.ncsu.edu/robeson/)  
 email: [james\\_cochran@ncsu.edu](mailto:james_cochran@ncsu.edu)  
 telephone: 910-671-3276

James Parsons, Area Specialized Agent, Poultry  
 \*Duplin, Sampson and Wayne Counties  
[www.ces.ncsu.edu/duplin/](http://www.ces.ncsu.edu/duplin/)  
 email: [james\\_parsons@ncsu.edu](mailto:james_parsons@ncsu.edu)  
 telephone: 910-296-2143

Jody Smith, Area Specialized Agent, Poultry  
 Anson, Cabarrus, Montgomery, Richmond, Scotland, Stanly and \*Union Counties  
[www.ces.ncsu.edu/union/](http://www.ces.ncsu.edu/union/)  
 email: [jody\\_smith@ncsu.edu](mailto:jody_smith@ncsu.edu)  
 telephone: 704-283-3743

(\*Administratively housed in this county.)

**QUARTERLY INTERDEPARTMENTAL MEETINGS  
AT NCSU**

Dan Campeau  
Area Specialized Agent - Poultry  
NCSU

One of the great ways that our NCSU Poultry Science Department supports their Extension Educational Outreach Program is by having Quarterly Interdepartmental Meetings. Specialists from our NCSU Poultry Science Department, Specialized Area Poultry Cooperative Extension Agents, Food Science Department Specialists, School of Veterinary Medicine Specialists, and representatives from our NC Poultry Federation attend and discuss topics of interest. Many times topics range from legislative updates to what is new and exciting in Poultry Processing. It gives us all a chance to get together and plan our educational programs for our outreach programs geared towards our North Carolina Poultry Industry.

Examples of ideas that are being worked upon are our Quarterly Poultry Industry Newsletter that is distributed to all our North Carolina Integrators as well as all one hundred county offices of the Cooperative Extension Service across our state to be copied and shared by all our North Carolina Poultry Growers. It is a good way to let our Poultry Industry know about anything that will impact our Industry from environmental rules and regulations to legislative updates. Another example would be the project that Dr. Mike Wineland is working on. He is collating a booklet of all the different educational programs that our Interagency Specialists and agents from NCSU can offer our Poultry Industry for Grower meetings, Servicemen training, and possible Intra-company in- service training opportunities.

If any integrators, growers, or servicemen have ideas to make our Extension Educational Outreach programs better please contact any of our Area Poultry Agents and we will bring up these ideas and/or concerns at our Quarterly Interdepartmental Meetings.

An index of our Specialized Area Poultry Agents can be found in this Newsletter. Past copies of our Quarterly Newsletter can be found at [www.ncsupoultry.com](http://www.ncsupoultry.com).