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PoultryPractices

Oklahoma Cooperative Extension Service

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

This issue

www.poultrywaste.okstate.edu

Editor's Column

We are excited to publish the first issue of Poultry Practices, a newsletter developed for both poultry producers and poultry litter applicators. Our goal is to provide science-based, objective information for those involved with the poultry industry. An electronic version of our newsletter is available online at poultrywaste.okstate.edu where you can also find useful fact sheets, links, regulatory information and upcoming poultry waste management classes.

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E. coli Transport after Poultry Litter Application

Josh Payne

Questions exist concerning *E. coli* contamination of waterways following manure land application events. Oklahoma State University, Biosystems and Ag Engineering researchers recently conducted a field study evaluating surface runoff transport of *E. coli* following poultry litter application to pastureland.

Experimental Design: Pasture plots, which consisted of ryegrass, fescue grass, bermudagrass and some Johnsongrass, were established at the Eastern OK Research Station in Haskell. Cattle had not been allowed access to the pasture for over one year and poultry litter had previously been applied one year prior to the study. Broiler litter was applied to 14 plots at a rate of 2.2 tons/acre. Two control plots received no litter application. An artificial rainfall simulator was used to produce 2 yr and 5 yr storm events.

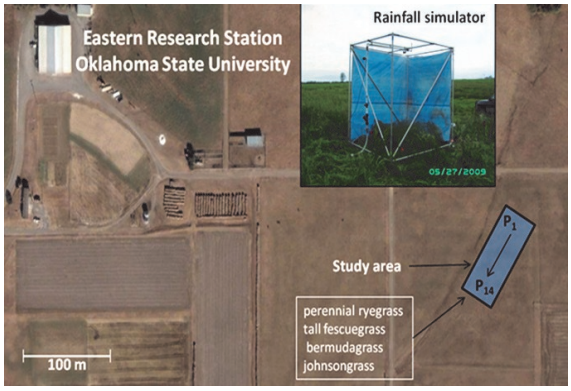

Figure 1. Aerial image of the OSU Eastern Research Station in Haskell, OK, including the study area location of the plots and the rainfall simulator.

Rainfall was applied at 0 h, 24 h and 120 h after litter application. Surface runoff was collected using a flume installed in a trench (Fig. 1). Water samples were tested for *E. coli* populations.

Results: *E. coli* event mean concentrations (EMC) in sampled runoff decreased at 24 h and 120 h when compared to 0 h after litter application (Table 1). How-

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ever, a slight increase in populations was observed at 120 h as compared to 24 h. This slight growth may have been due to litter in contact with the soil surface and protected from ultraviolet light and moisture loss by vegetative cover.

In control plots, *E. coli* was always detected, indicating other sources of *E. coli* aside from poultry litter. Other sources may include rodents, birds, and other small mammals.

	Control	0 h	24 h	120 h
Average EMC	6.8×10^3	1.6×10^5	1.3×10^4	4.3×10^4
Maximum EMC	7.7×10^3	2.2×10^5	2.6×10^4	6.2×10^4
Minimum EMC	5.8×10^3	5.0×10^4	7.1×10^3	1.9×10^4
	P-Values from ANOVA Test on Average EMCs (95% CL)			
0 h	0.053	--	0.008	0.024
24 h	0.412	0.008	--	0.026
120 h	0.058	0.024	0.026	--

Table 1. *E. coli* event mean concentration (EMC, MPN/100 mL).

Conclusions: Poultry litter applications may contribute to runoff of *E. coli* when rainfall events occur shortly after litter application. However, other sources of fecal contamination may serve as a significant component of the total *E. coli* EMC, especially as the time lag between litter application and rainfall event increases.

Figures 2 & 3. Illustration of plot vegetation and the down slope outflow flume.

References:

Guzman, J. A., G. A. Fox and J. B. Payne, 2010. Surface runoff transport of *Escherichia coli* after poultry litter application on pastureland. Trans. ASABE. 53(3):779-886.

Hormones and Poultry Debunked

Josh Payne

A common misconception in the minds of the general public is that growth hormones are used in the production of poultry. The simple truth is that growth hormones are NOT fed or administered to commercial poultry. In fact, federal law prohibits the use of added hormones in poultry or swine production.

Genetic selection, good nutrition, and proper husbandry of the birds are responsible for rapid growth rates and feed efficiencies, not hormone use. In fact, most poultry are grown to their physiological limit, thus there would be no added benefit to using hormones. Attempting to exceed this limit through hormone use would be counter productive and would most likely result in increased mortality rates.

In addition, chicken growth hormones are actually proteins. If used as a feed additive, these proteins would be broken down into amino acids and rendered ineffective upon entering the bird's gastrointestinal tract. The only way for a hormone to be effective would be to inject it periodically into the chicken. Routinely injecting 30,000 birds in a typical broiler house is simply impractical.

Some retail poultry products are marketed as "*No hormones added*" which only clouds the mind of the consumer. This may lead to the false assumption that hormones are used unless stated otherwise. In fact, the claim "*No hormones added*" cannot be used on the labels of pork or poultry unless it is followed by the following statement: *"Federal regulations prohibit the use of hormones."*

Are There Weed Seeds in Poultry Litter?

Josh Payne

Land application of poultry litter, a mixture of bedding material and manure, is known to provide an abundant source of plant macro- and micronutrients. Subsequent applications of litter can even boost soil organic matter and pH. One common misconception is that poultry litter contains viable weed seeds. This idea may have formulated after observing substantial weed growth following land application of litter.

Research evaluating weed seed viability in manure dates back to the 1930's. Harmon and Keim (1934) fed 1000 seeds from each of 7 common weed species to calves, horses, sheep, hogs and chickens (Fig. 4). The results indicate that chickens were much more efficient at destroying weed seeds compared to livestock. This was most likely due to a unique anatomical feature possessed by poultry, a gizzard, whose chief function is to grind or crush food particles.

Additional hurdles that weed seeds must overcome to survive in modern day feed and animal production include improved seed cleaning equipment and regulations aimed at reducing the presence of weed seeds in both livestock and poultry feed. Yet another hurdle for weed seeds is the current feed pelletizing process. Commercial poultry are fed pelletized feed that is exposed to extreme temperatures reaching up to 200°F, capable of destroying weed seeds.

Furthermore, research has been conducted to validate that weed seeds are not present in poultry litter. Auburn University compared broiler litter to equal rates of commercial N and P fertilizer. Each treatment was mixed with a sterile potting medium. The treated soil was then placed into greenhouse trays. Half of the trays were inoculated with common weed seeds while half received no weed seeds. The soil was kept moist for 6 weeks. Results showed that weeds only grew in trays where seeds had been planted, providing evidence that litter did not introduce weed seeds.

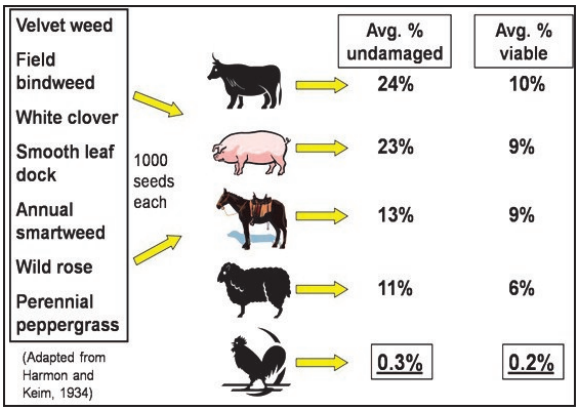

Figure 4. Average percentage of undamaged and viable seeds recovered from various animals.

North Carolina State University conducted a similar field

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Weed seeds- continued from page 3

study analyzing the viability of weed seeds in poultry litter. Field plots were established and half of the plots per treatment were fumigated with methyl bromide while half received no fumigation. Fumigation was used to eliminate or reduce existing weed species prior to treatment application. Poultry litter and commercial N fertilizer treatments were then applied to field plots at rates to supply 120 lbs of plant available N per acre. A control treatment was included that received no commercial fertilizer or litter. On day 21, weed species were identified and populations were counted. After day 49, weeds were harvested to determine total dry matter accumulation. Fumigated plots showed few or no weeds while non-fumigated plots had numerous weeds. Total dry matter accumulation was significantly higher in non-fumigated plots compared to fumigated plots. Additionally, weed species identified and populations present in the litter treated plots were similar to the commercial N treated plots and the control plots. These findings demonstrate that weed species, weed populations and total weed dry matter accumulation were not influenced by the addition of poultry litter.

In summary, both studies provide supporting evidence that weed seeds are not introduced into the soil following the application of poultry litter. However, due to its soil amendment properties, litter can have a dramatic effect on the germination and growth of weed seeds already present in the soil. This may help explain why some producers observe a flurry of weed growth following land application of poultry litter.

References:

Zublena, J.P., C.C. Mitchell, J.T. Parsons, R.H. Walker, T.A. Carter and D.A. Crouse.1995. Viability of weed seed in poultry manure and mortality compost. 7th Int. Symposium on Ag. and Food Processing Wastes Proceedings. pp. 162-169.

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