CORNELL POULTRY POINTERS

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1998 FRIEND OF THE DEPARTMENT AWARD

Dr. John Huntley is the recipient of this year's Friend of the Department award presented at the 1998 Cornell Poultry Conference on June 17th at the Ithaca Ramada Inn. Dr. Huntley has been instrumental in helping the New York State poultry producers whenever an emergency/problem arose. Because of his dedication and commitment when a positive broiler flock with AI was identified in the Sullivan County area in 1995, he convinced officials at New York State's Department of Agriculture and Markets to provide enough money for immediate eradication of the infected flock before it could cause problems on other poultry farms. He has immensely helped New York State poultry producers in formulating the New York State Egg Quality Assurance Program which would enhance consumer's confidence about the safety of eggs produced in New York State, and help to overcome all the barriers to make sure that the referendum would be signed into law by the Commissioner of Agriculture, New York State Department of Agriculture and Markets. As we all know, it was due to John Huntley's timeless efforts and sincere cooperation with the industry and Cornell faculty that the NYSEQA was signed into law on June 11, 1997. John has been an invaluable asset for us by being a speaker or a part of the poultry disease forum during the past several years at the annual Cornell Poultry Conference. He has been effective in keeping Cornell faculty and the industry up to date about the latest regulations by serving as a member of the Advisory Council of the Unit of Avian Medicine, New York State College of Veterinary Medicine, Cornell University, since it was established in the early 1990's. All of the above are reasons why John Huntley is the recipient for 1998 of the Friend of the Department award. This is a well-deserved recognition since John is truly a friend to so many of us. Thanks John for being there for all of us.

K. Keshavarz
Department of Animal Science
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CONTENTS

The following are talks that were presented at the 1998 Cornell Poultry Conference held June 17, 1998, at the Ithaca Ramada Inn.

ANIMAL WELFARE/ ANIMAL RIGHTS: INDUSTRY RESPONSE

OFAC was formed in 1988 by the province's major livestock and farm groups as a collective and coordinated effort in dealing with animal agriculture and food production issues. We are best known for our focus on the animal rights issue. It was this issue that spurred the formation of the council. Most of you have probably heard of and possibly read a book called Diet for A New America by activist John Robbins. If you haven't, I suggest you pick up a copy. This book single handedly attacks every aspect of animal agriculture and animal food products. More importantly it shows the need for agriculture to address animal use issues with the public. This book and other efforts by the "anti-use" movement showed us at OFAC the need to address a wider range of subjects than just animal care and so we expanded our mandate to address issues related to animal care, environment, food safety and new technology. Today we represent over 300 cross-commodity members: from individual producers to multi-national food companies.

As a membership-based non-profit education organization our objectives are three-fold:

- to improve understanding and appreciation of current animal agriculture and food production; by providing accurate, reliable and credible information and education.
- to promote responsible industry practices; through information, programs and research.
- to contribute to balanced public debate; through issues management, communications and coordinated efforts.

The OFAC Approach:

Put a face to farming.
Identify credible key messages and effective delivery methods.
Show farming and food production realistically and honestly.
Use critical thinking approach to addressing emotional issues.
Explain both WHAT we in the agri-food sector do and WHY we do it.
Walk the Talk; demonstrate to the public the sectors' commitment to responsible animal use.
Proactive; keep the public accurately informed, identify and address real "problems" in the industry, self regulate.
Build alliances both within and outside the agri-food community.

OFAC acts as a customer service centre for both those within and outside the agri-food industry.

- Public Outreach: consumer information materials, media relations, school education, farm displays, information centre to answer individual questions and concerns.
- Monitor and report on animal rights movement and public perceptions/opinions, and advise on animal rights/deep ecology, and assist in responding to animal use issues.
- Industry training programs and resources on communications: answering difficult questions, media training, agriculture ambassador training, dealing with difficult situations, education using animals.
- Speakers bureau and displays to increase awareness and support for OFAC and to improve public understanding and appreciation of agri-food sector.
- Develop and/or promote industry-directed initiatives regarding animal care, environment and food safety.
- Work with partners to develop materials/programs/policies and to deliver them to target audience.

[Talk presented by Leslie Balletine, Ontario Farm Animal Council (OFAC), Mississauga, Ontario, Canada.]

THE PERFECT PULLET

Introduction

You've all heard and read about the breeders' instructions for raising perfect pullets. Everyone agrees that it's the pullet that makes the layer, and once she's in the laying house, the mistakes made in the pullet house are there for good or ill.

So I will not bore you with the instructions: just read the management guide from your favourite breeder, and you'll get all the fine details.

What I would like to do is review some of the things that aren't in the management guides, either because the authors are reluctant to include them, or because they are just so embarrassing that people don't like to talk about them.

The Chick

All chicks are not born equal! If the breeder flock owner or the hatchery has short changed the nutrition of the breeder flock, then this will be reflected in hatchability, and/or the performance of the resulting offspring.

Poor hygiene in the breeder flock, or, worse, in the hatchery, will result in chicks with high bacterial loads, potential mortality and/or poor growth, as they battle with bacteria instead of using valuable feed for growth and development. This, the pullet grower cannot reverse; he/she must live through it along with the flock.

Incorrect handling in the hatchery or during transportation can also result in poor chick quality, and subsequent retarded growth and/or mortality.

What about small chicks? Hatcheries should hatch and deliver chicks from separate breeder flocks separately. The chicks from any one breeder flock should be uniform, but it is a fact that eggs from older hens produce larger chicks and those from young flocks, smaller ones. The latter will catch up if reared separately. There is nothing intrinsically wrong with small chicks from young breeders. In fact, they may come from parents which are one generation further along the chain of genetic improvement than those from older flocks.

The Brood - Grow House

Sanitation is all-important here. We are placing young, highly susceptible chicks in an artificial environment. Since we are attempting to control, to a large extent, the bacterial and viral status of our birds, we try to start with a "clean slate".

Isolation of buildings from those housing adult hens is of prime importance. How far is "isolated"? It depends on how far is required before the attendant can resist the temptation to check the pullets without taking proper precautions. It also depends on prevailing winds and the likelihood of dust from layers being drawn into the growing house. For farmers starting from scratch, I have suggested a minimum 500 yards between layers and pullets.

The newly hatched chick lacks the intestinal flora of the adult, and has only limited maternal immunity as a defense against viruses and bacteria.

The bacterial status of the intestine is of considerable interest. In naturally hatched chicks, within a few hours of hatching, the gut will be colonised with a variety of bacteria from the mother hen's environment. Until comparatively recently, commercial producers have largely ignored this process. However, we have now developed probiotic cultures (Direct Fed Microbials) and Competitive Exclusion products which are intended to replace the natural colonising process. However, even these may have difficulty in becoming established if they have to compete with an environment already loaded with bacterial residue from a previous crop.

Of equal or greater importance is the status of the building for Marek's disease (MD). Again, nobody is in much doubt now that MD can become a serious problem if chicks, even properly vaccinated ones, are exposed to high levels of MD virus in the first 7 - 10 days of life, before the vaccine immunity kicks in. Residues of feathers (particularly), fecal material and other debris from a previous crop of pullets is almost a guarantee that some MD will occur.

Some successful pullet growers in Ontario now use some or all of the following strategies to limit contamination of newly placed chicks with MD:

- Clean-up with foaming type disinfectants to destroy biofilms on cage and house surfaces.
- Shower-in facilities for staff looking after growing pullets.
- **Total** isolation of personnel in the brooder house for the first 14 days.

You may develop additional strategies to address these principles.

Another factor in brooding/growing is the design, structure and operation of the facility. Here we must give priority to the comfort of the day-old chick, and the capacity to adjust environmental conditions as she develops to a laying pullet at 18 weeks. Pay strict attention to temperature and lighting control. Elaborate, complex structures don't necessarily have a monopoly in providing the best environment.

The People

The people who look after young chicks should be properly trained and should also have adequate experience. An understanding of aspects as temperature control, lighting, and the principles of disease control and vaccination are extremely important.

Especially in cases where attendants work alone for extended periods, for example at the start of a crop, they should have access to sources of information to deal with emergencies as they arise. It has been my experience, and I say this even as a scientist, that some people are much better as attendants for growing chicks than others. The reasons are not immediately apparent, but the results show in the quality of pullets produced.

Feeding

There are very precise nutritional recommendations in breeder management guides which should be followed. Usually, the program is tied to growth and body mass development, and some index of frame development such as shank length.

Provided each bird receives the correct feed allocation, we should arrive at point of lay with a well developed pullet capable of delivering its genetic potential in terms of egg mass output.

Problems arise if birds don't have equal access to feed, and so some receive larger, and others, smaller, feed allocations. We then have some precocious birds, and some with delayed maturity due to failure to achieve optimum body weight.

This usually results from inadequate feeder space. The design of many grower cages is such that each bird has about two inches of feeder space. Layer cages normally provide three to four inches and in jurisdictions where welfare rules exist, four inches is usually mandatory. Canadian welfare codes recommend four inches. Pullets which approach maturity with two inches or less trough space run the risk of lack of uniformity, with some birds permanently compromised in terms of production potential.

The solutions are few. When designing grow-out cages, look for a system giving maximum trough space. This means cages should be square, or wider than they are deep. With existing cages, multiple feedings may help to ensure that all birds get equal access. Consider moving pullets to the laying house as early as possible, even at fifteen or sixteen weeks, so that the last few days of the growing period are spent with more access to feed.

Beak Trimming

Perhaps the greatest challenge for pullet growers is that of beak trimming. Here, a pullet's production potential can be maintained or enhanced, or it can be practically destroyed if the job is not done correctly. Beak trimming is a controversial subject because some animal welfare advocates regard it as unnecessary mutilation of the bird. They fail to recognize that the potential of feather pecking and/or cannibalism may represent a more serious threat to the bird's welfare than does beak trimming, when correctly carried out.

Some European countries have banned the practice of beak trimming. This has led to serious evaluation of different breeds, because some respond better than others to management without beak trimming. There is good evidence that selection is possible to produce varieties which would not require beak trimming, but this will not happen overnight.

As you may be aware, Don Bell, from U.C. Riverside, has reported on a large scale trial in which two flocks were compared, one of which was not beak trimmed. Results showed that at 60 weeks of age, profits from the two flocks were identical. Projections based on the performance in the last two four-week periods prior to 60 weeks suggested that the beak trimmed birds would have been more profitable at 78 weeks.

However, managing birds with intact beaks is a considerable challenge, and for the foreseeable future many producers here will continue to beak trim virtually all their flocks.

Most breeders recommend early beak trimming as the first choice. This means doing the job at six to ten days of age. Some call this "precision beak-trimming" and it is indeed well named. Precision is the key, because if this work is done precisely and correctly, it will last a lifetime. I've taken some of the key advice from various management guides and some respected individuals because this task is so important. Everybody knows this, but I have seen many flocks where somebody has ignored just one of these recommendations and compromised the potential of large numbers of pullets.

1.) **Don't hurry!** The best operators can beak trim 800 birds/hour. **Don't worry** if your crew does only 600.
2.) Ensure your beak trimming crew(s) have good training and supervision.
3.) Add electrolytes and vitamin K to drinking water 3 days before, and for 3 days following, beak trimming.
4.) Avoid excessive cauterization after the trim is accomplished.
5.) Replace beak trimmer blade frequently.
6.) Keep the blade at the correct temperature (1100F - 1350F for 7-10 day old chicks).
7.) Increase the level of feed for newly beak trimmed birds.
8.) Do not trim sick birds.
9.) Do not trim within one week of a vaccination.

Lighting

Everyone is aware of the importance of lighting programs in pullet development. In conditions where natural light affects some or all of the pullets, maturity tends to be earlier for spring raised birds. But the modern pullet is much less influenced by lighting patterns than those of a half century ago, when the principles of light control were being developed. Pullets will commence laying without stimulation, on a continuous daylength or even in darkness. Perhaps the most important factor now is lighting uniformity. Many buildings used for pullet growing allow light to enter through air inlets or fan openings. Birds adjacent to these may respond to natural daylength changes instead of those imposed by artificial light. So we get a proportion of pullets maturing precociously in spring, or late in autumn, while the majority still respond to the artificial daylength changes prescribed by the lighting program. Lack of uniformity in maturity may result in poor peaks, and excessive blow-outs among early maturing pullets.

Choices here are to modify the building to create "blackout" conditions, or to use a lighting program which takes into account the natural lighting pattern.

The choice of lighting pattern should take into account the breeder's recommendations, seasonal effects, and also specific market conditions for which pullets are destined.

1.) Pullets raised in hot weather may experience low feed intake. Consider longer days and efforts to stimulate feed consumption.
2.) If there is no demand (or anticipated premium) for extra large and jumbo eggs, early light stimulation may be valuable, provided the correct body weight can be achieved.

[Talk presented by Peter Hunton, Ontario Egg Producers' Marketing Board, Mississauga, Ontario, Canada.]

PROGRESS IN NUTRITION OF LAYING HENS

How many different feeding strategies are there for feeding layers? This isn't the type of information that you'll find in a textbook, however if you total up the number of producers and nutritionists and multiply by two you'll be close. Which feeding strategy is best? While there is no one best strategy, all good feeding strategies utilize the same basic nutritional principles. As I have attended nutrition meetings over the last year I've been waiting for the next big break through. But there doesn't seem to be one coming. As it is very unlikely that there will be any significant new nutritional discoveries in the nutrition of laying hens, all future advances in feeding strategies will have to come from fine tuning and better utilizing the knowledge we already have. Just as a growth rates with increasing nutrient requirements plateaus, so has our the improvements in layer feeding programs. The goal of this presentation is to review these basic principles and hopefully stimulate some thoughts on how to further improve future layer feeding strategies.

Sometimes it is important to know where you've been before you decide where you want to go. Let's review where we've been with a historical perspective of layer feeding programs in the Northeast. This will help illustrate the magnitude of the advances in feeding strategies that have taken place over the last 40 years.

Going back 30 to 40 years the feeding program was quite simple, once a year nutritionists from the universities and the feed industry would get together and develop the feed formulas for the next year. Initially, a single formula for laying mash was produced. Unlike current formulas with nutrient specifications, the early formulas were fixed formulas, which specified the ingredient composition of the feed. The same formula was fed until the following year when a new formula was put together.

The next advancement came when the change was made from formulating based on ingredients to formulating based on nutrients. Initially these feeds were formulated on a crude protein basis with the same feed typically being fed for the entire laying period. This constitutes what I consider the first of the four major paradigm shifts in layer feeding strategies. As we began to determine the nutrient requirements of layers we shifted from blending ingredients to blending nutrients which was a major shift in thinking. Then as the producers became more sophisticated, multiple feed formulas containing different levels of crude protein were formulated. Soon layer feeds were available containing from 16% to 20% crude protein.

In the late 1970's the feeding strategy switched from feeds formulated based crude protein levels to feeds formulated based on amino acids. Many producers were slow to accept these new feeds and a few still haven't. During this time we also began to fine-tune the requirements for other nutrients.

Around the same time the strategy of feeding layers on a daily nutrient intake basis started. This is what I consider the second paradigm shift in layer feeding strategies. Feeding on a daily nutrient intake basis adjusts the nutrient density of the feed as daily feed intake changes to provide the same daily nutrient intake. Utilizing this concept the daily nutrient intake remains the same through out the lay cycle. This is supported by the 1994 NRC Nutrient Requirements of Poultry which states that layers have the same daily requirements for nutrients in all phases of egg production.

Next the concept of phase feeding was introduced with the daily nutrient requirements changing during the various phases of production. This can be thought of as a fine-tuning of the daily nutrient intake concept with large economic savings. Typically the daily nutrient requirements are decreased as the birds become older and production decreases (Figure 1). The economic savings of going from constant nutrient requirements during the laying cycle to different nutrient requirements for each phase of egg production can amount to over $10,000 per 100,000 birds per year (Figure 2).

In the early 90's as the egg industry continued to become more integrated and competitive many producers started to look for new feeding strategies to reduce cost and improve profitability. Hence the third paradigm shift. Rather then viewing the nutrient requirements of laying hens as a fairly static number, changing with the phase of production, it began to be viewed more as a moving target that changed constantly. The challenge was to determine what the requirement was at any one time. A new feeding strategy was developed to formulate layer feeds on a weekly basis (Figure 3), based primarily on current and past performance. Compared to a standard phase feeding program formulating on a weekly basis can save in the range of $6,000.00 per 100,000 birds per year (Figure 4), about 6 cents per bird assuming that they maintain the same level of production. In actuality the savings can be significantly more as the feed can be fine-tuned and safety margins reduced. When feeds are formulated on a weekly basis the flock performance is usually monitored more closely and small changes in performance are picked up and little problems corrected before they become big ones. Another advantage is that because deficiencies that may occur due to ingredient variations are easily compensated for, safety margins can be reduced saving money without reducing performance. Formulating feeds weekly continues to evolve. The nutrient requirements are modified based on performance factors such as house temperature, feed consumption, rate of lay, egg weight, age, body weight gain, feathering and strain. These values are further modified based on desired production parameters such as egg weight and feed consumption. While much of this is done based on prediction equations there is still some art involved as the prediction equations are not 100% correct. As the database of performance history becomes larger, the accuracy of the prediction equations will improve.

The next paradigm shift is currently taking place. Evolving feeding strategies will be fully integrated and designed to modify production output. These programs will alter the composition of the eggs and manure produced to maximize profitability and minimize the impact on the environment.

They will start with the nutrient requirements for the specific generation of the strain of layers. The breeder will provide information such as chick weight and breeder flock vaccination programs, which will be, incorporated into the feed formulation prediction equations. The pullet growing records and feeding program will also be entered into the equations. The layer house environmental systems will be linked to the record keeping, formulation and feed milling systems, totally integrating the feeding program. Technology such as NIR will be used to assay incoming ingredients before they are used. Every load of feed will be custom formulated for the specific flock based on the input information plus information such as market forecasts, desired production, weather forecasts, etc. The composition of the manure will be monitored with NIR technology and used to modify the feed formulation. It will be another tool to tell us when we are over or under formulating a nutrient. While the future savings when changing feeding strategies may not be as great as the savings we have seen in the past they may make the difference between profitability and loss in the future.
[Talk presented by Robert Stock, Agway, Inc., Syracuse, NY.]

Figure 1. Constant Nutrient Requirements Versus Changing Requirements
Daily Meth + Cys Intake

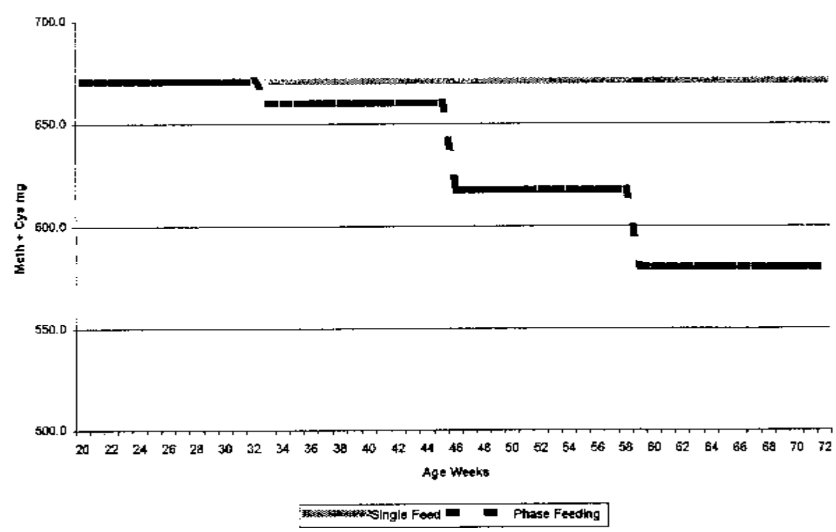


Figure 2. Weekly Savings per 100,000 Layers Using Phase Feeding

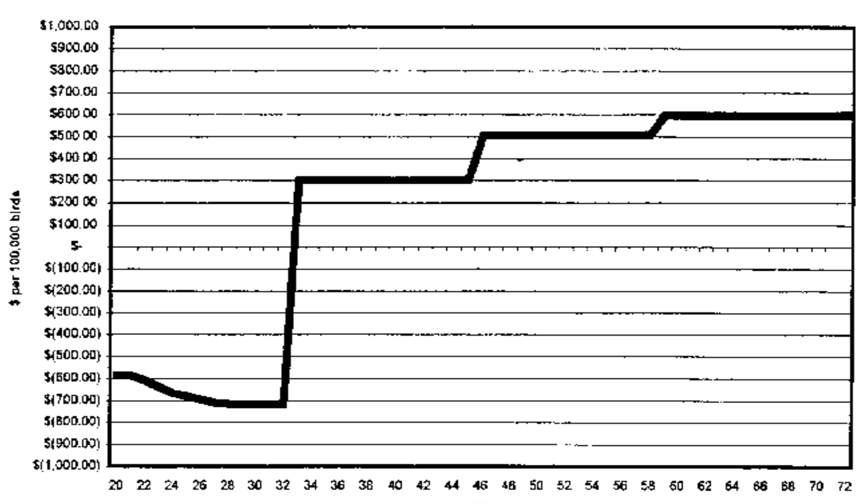


Figure 3. Phase Feeding Nutrient Requirements Versus Weekly Feeding Daily Meth + Cys Intake

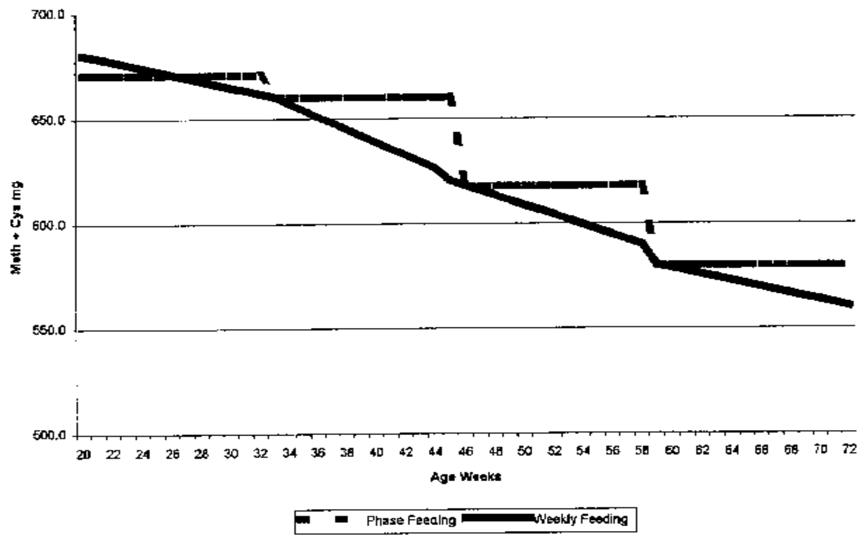
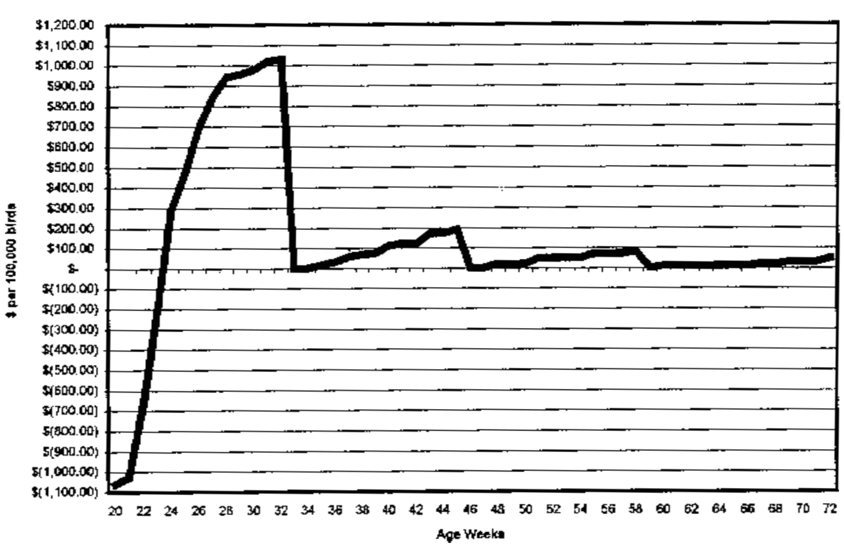


Figure 4. Feed Savings per 100,000 Layers Using Weekly Feeding



NPDES REGULATIONS FOR CONCENTRATED ANIMAL FEEDING OPERATIONS

Since 1972 the Clean Water Act (CWA) has defined concentrated animal feeding operations as point sources prohibited from discharging pollutants to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. The main objective of the law was to control the runoff from large open feedlots. The wording of the law reflects this and causes some ambiguity when the law is applied to other situations. Poultry operations were included in this law with particular attention to those poultry operations that have continuously flowing waterers and liquid manure systems. The Southview vs. CARE lawsuit made farmers realize how vulnerable they are to citizen's suits if they are designated as a concentrated animal feeding operation (CAFO) and they aren't covered under a permit. EPA has interpreted liquid manure systems as those that include solid manure stored in piles that flows off the site when it rains. This should alert poultry producers to be proactive in their response to the CAFO issue.

EPA is turning its attention toward the non-point arena. They now believe that 60% of the surface waters not meeting standards today is from non-point sources. They feel that 80% of the non-point pollution is from agriculture. In general, EPA says animal waste contributes half of the pollution from agriculture. Using their figures one-fourth of the water pollution in the country is from animal waste. EPA is actively working to get states to comply with this requirement. In the northeast, Ohio, New Jersey, Virginia, and Maryland are the states that have a permit procedure in place at this time.

Even though there aren't many large open feedlots in the northeast, there are other reasons that this regulation will get more attention. More farms are becoming large enough to fall within the size limits requiring permits. The number of rural non-farm residents are increasing and their tolerance of environmental mishaps is decreasing. Farmers have an increasing concern about their exposure. Both large and small farms need to be informed. Farms that don't yet fall under the size requirements for a permit can be designated as a CAFO if there is a discharge. The criteria for a permit may become the standard of the industry that all farms may be judged by. Farms that already have the animal units that would need a permit will reduce their risk of being sued by obtaining a permit. An inadvertent discharge from a large farm potentially could have a large impact on the environment as well as being more likely to be noticed and complained about. Increased awareness of the problems from excess phosphorous in drinking water sources and estuaries may increase the attention focused on farms.

New York State is in the process of developing a general State Pollution Discharge Elimination System (SPDES) permit for CAFOs that will require farms to comply with the CWA. The general permit is expected to be issued in the spring of 1999. The following information is based on the preliminary discussions from a working group set up to advise NYSDEC. Things may be different from the general agreements reached in the working group.

CAFOs are specifically defined as point sources subject to the NPDES permits program. It is important to realize that an actual or ongoing discharge is not required for a facility to be covered by the NPDES regulations. The definition of a point source in the CWA includes concentrated animal feeding operations from which pollutants are or may be discharged. In fact, the permits require a plan to prevent all point source discharges.

NYSDEC will concentrate on the larger farms that are defined as follows. A CAFO is a feeding operation where; animals are kept for more than 45 days in a year, there is no vegetation, and it has;

More than 1,000 animal units

If either the number of any one species exceeds the corresponding number indicated below, or the cumulative number of animal units exceeds **1,000,** the animal feeding operation is a CAFO and should be covered by a NPDES permit:

1,000 slaughter and feeder cattle,

700 mature dairy cattle (whether milked or dry),

2,500 swine each weighing over 25 kilograms (55 pounds),

55,000 turkeys,

100,000 laying hens or broilers (when the facility has unlimited continuous flow watering systems),

30,000 laying hens or broilers (when the facility has liquid manure handling system (which may include rain washed solid manure).

Between 301 and 1,000 animal units and that may discharge:

16,000 turkeys,

30,000 laying hens or broilers (when the facility has unlimited continuous flow watering systems),

9,000 laying hens or broilers (when the facility has liquid manure handling system (which may include rain washed solid manure).

Into waters of the United States through a man-made ditch, flushing system, or similar man-made device. (This could be a tile line or ditch that was not created specifically to carry animal wastes but does during storm events); or,

Directly into a stream or dry creek bed running through the area where animals are confined that originates outside of and passes over, across, or through the facility or otherwise comes into direct contact with the animals confined in the operation.

Been designated a CAFO by the permitting authority on a case-by-case basis.

No operation may be designated a CAFO on a case-by-case basis until the permitting authority has conducted an on-site inspection of the facility.

In the humid northeast most farms do have the potential to discharge when manure is spread on the land. Most farms with more than 300 animal units need a permit.

The requirements for a CAFO permit:

Operations must have storage facilities that are properly constructed and operated to hold manure, wastewater, and polluted runoff from a 25-year, 24-hour storm event (4 to 6 inches in 24 hours in the northeast) if they are exposed to rainfall. Manure will be contained and spread on the land according to a nutrient management plan (NMP) or treated using practices like a filter area. Non-point pollution leaving a **properly** designed and maintained treatment area or from land receiving nutrients according to a NMP should not be considered a regulated discharge. Professional help in planning and designing these practices can be obtained from private consultants as well as agencies.

The operation will need to have a NMP to show that the collected wastes as well as the manure are applied at rates that after subtracting the nutrients needed to achieve realistic crop yields will not cause losses to the environment that would degrade surface or ground water. Although runoff exceeding state standards remains regulated, the farm that has a permit and is spreading according to it's approved NMP won't be considered to be discharging when runoff occurs. The plans will likely include.

- Farm and field maps indicating acreage, crops, soils, and waterbodies.
- Realistic yield expectations for the crop(s) grown.
- A summary of available nutrient resources including: soil test results for pH, phosphorus, nitrogen, and potassium: a nutrient analysis of manure or other effluent; nitrogen contribution to the soil from legumes grown in the rotation.
- Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on realistic yield expectations. NMPs should be balanced on the nutrient that is the most critical concern in the watershed.
- Identification of application and timing methods for nutrients in order to: achieve realistic crop results, reduce losses to the environment, and avoid application to frozen soil or during periods of leaching or runoff.
- Proper calibration and operation of nutrient application equipment.

More facts on CAFOs

Two operations with the same owner are considered one operation for permitting purposes if they share a common border or if the wastes are handled using a common area or system.

A farm that is not discharging can be required to obtain a permit if it is determined that there may be a discharge.

A farm that didn't obtain a permit but then has a discharge can be fined by the regulatory authority for not having a permit until a permit is obtained. A farm without a permit can also become the target of a citizens suit under the dean water act. This is what happened in Southview vs. CARE. If a permitted farm is sued, the NYSDEC can enjoin the suit if it chooses to. The agency will continue to take steps to prevent discharges.

A totally enclosed facility with no discharge (and no anticipated or potential discharge) of animal waste to waters of the United States is not a CAFO. But if the ultimate fate of the manure is land spreading it will be hard to show that there is no potential discharge.

The smart manager will plan to meet these requirements. As expansions or improvements to your facilities are being planned it is important to determine which practices will be needed to obtain a permit and include their cost in the budget. Those farms with less than 300 animal units may find that they are eventually expected to meet the same criteria as the larger operations.

References

Wright, Peter E. and S. L. Machovec. "Environmental Quality Incentives Program and Concentrated Animal Feeding Operations (EQIP and CAFOs)" 1996. Animal Agriculture and the Environment: Nutrients, Pathogens, and Community Relations. Northeast Regional Agricultural Engineering Service. NRAES-96.

US Environmental Protection Agency, *Guide Manual On NPDES Regulations For Concentrated Animal Feeding Operations,* US Environmental Protection Agency, Office of Water, Washington, DC. 1995.

[Talk presented by Peter Wright, Department of Agricultural and Biological Engineering, Cornell University, Ithaca, NY.]

NEW INFORMATION AND GOVERNMENTAL REGULATIONS ABOUT HAZZARD ANALYSIS AND CRITICAL CONTROL POINTS (HACCP)

[Federal Register: May 19, 1998 (Volume 63, Number 96)]
[Proposed Rules]
[Page 27502-27511]
From the Federal Register Online via GPO Access
[wais.access.gpo.gov]
[DOCID:fr19my98-23]

Proposed Rules
Federal Register

This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

[[Page 27502]]

DEPARTMENT OF AGRICULTURE
Food Safety and Inspection Service
7 CFR Part 59
[Docket No. 96-035A]
RIN 0583-AB
DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration
21 CFR Part 100
[Docket No. 97N-0322]
RIN 0583-AC52
Salmonella Enteritidis in Eggs
AGENCIES: Food Safety and Inspection Service, USDA; Food and Drug Administration, HHS.
ACTION: Advance notice of proposed rulemaking; request for comments.

SUMMARY: Eggs contaminated with Salmonella Enteritidis (SE) are associated with significant numbers of human illnesses and continue to be a public health concern. SE infected flocks have become prevalent throughout the country, and large numbers of illnesses have been attributed to consumption of mishandled SE-contaminated eggs. As a result, there have been requests for Federal action to improve egg safety. The Food Safety and Inspection Service (FSIS) and the Food and Drug Administration (FDA) share Federal regulatory responsibility for egg safety. However, regulation of shell eggs is primarily the responsibility of FDA. Through joint issuance of this notice, FSIS and FDA are seeking to identify farm-to-table actions that will decrease the food safety risks associated with shell eggs. The agencies want to explore all reasonable alternatives and gather data on the public benefits and the public costs of various regulatory approaches before proposing a farm-to-table food safety system for shell eggs. Interested persons are requested to comment on the alternatives discussed in this advance notice of proposed rulemaking (ANPR), suggest other possible approaches, and provide information that will help the agencies weigh the merits of all alternatives. In addition to the actions contemplated in this ANPR, both agencies are planning to take actions that address adoption of refrigeration and labeling requirements that are designed to reduce the risk of foodborne illness.
DATES: Comments must be received on or before August 17, 1998.
ADDRESSES: Send an original and two copies of comments to: FSIS Docket Clerk, Docket No. 96-035A, Room 102 Cotton Annex Building, 300 12th St, SW., Washington, DC 20250-3700. Reference material cited in this document and any comments received will be available for public inspection in the FSIS Docket Room from 8:30 a.m. to 1:00 p.m. and 2:00 p.m. to 4:30 p.m., Monday through Friday.
FOR FURTHER INFORMATION CONTACT: Mr. Ralph Stafko, Food Safety and Inspection Service, USDA, Washington, DC, 20250, (202) 720-7774, or Dr. Marilyn Balmer, Center for Food Safety and Applied Nutrition, Food and Drug Administration, HHS, Washington, DC 20204, (202) 205-4400.
[This information was taken from Ralph Stafko's talk.]

THE EFFECT OF GROWING DIET, FLOOR SPACE AND LIGHT REGIMEN ON EARLY EGG SIZE

Selection for early sexual maturity has received a great deal of emphasis in breeding programs in recent years due to two reasons; to reduce the growing costs and to increase egg production up to a certain chronological age. Although selection for early sexual maturity has been accompanied with selection for increasing early egg size, the extent of progress for the latter trait has not been as effective as for the advancement of the age of sexual maturity. As a result of these processes, a high proportion of eggs produced during the early stages of the egg production cycle are in the small and peewee categories that do not have a real market value.

Due of the economic significance of early egg size to the egg industry, during the past several years, we have been interested in exploring the approaches that could have the potential to increase early egg size.

The result of previous reports (Keshavarz and Nakajima, 1995 [Poultry Sci. 74:50-61]; Keshavarz, 1995 [Poultry Sci. 74:62-74]) indicated that early egg weight (average 20 to 38 wk of age) was increased by 3.8 g and extra-large plus large-sized eggs were increased by 26% when pullets which were moderately heavier that the breeder recommendation at 17 wk of age were fed a high-protein, fat-supplemented diet (21% CP and 4% fat) as compared to pullets that were light at a similar age and fed a conventional layer diet (17% CP and no supplemental fat) under isocaloric condition. The beneficial effect of high-protein, fat-supplemented diet on early egg weight and egg grades was consistent both with the light- or the heavy-body weight pullets, although the effect was more pronounced with light-body weight group. One of the major observations from this study was that, regardless of the diet, the pullets of the heavy-body weight group produced eggs that were 2 g heavier with 10% greater extra-large plus large-sized eggs than the pullets of light-body weight group. This information re-emphasized the significance of growing the pullets to target weight at the age of housing for increasing the early egg size.

We have been interested in determining whether body weight at the age of housing and as a result of this, early egg size can be increased by manipulation of dietary nutrients in the growing period and also by providing the pullets with more floor space that is normally used by the industry and by exposing the pullet to a proper step-down lighting regimen.

The experiment consisted of a 2 x 2 x 2 factorial arrangement of the treatments with two energy levels (1280 and 1380 kcal/lb), two fat levels (0 and 4% supplemental fat), and two protein levels (14 and 18%). Dietary methionine was kept at 2% of the dietary protein. The experimental diets were used from 14 to 18 wk of age. At 18 wk of age, pullets were transferred to a laying house and fed a layer diet containing 16.5% CP up to 34 wk of age.

Although body weight at 18 wk of age was significantly increased due to increasing energy or adding 4% supplemental fat to the growing diets, these increases in body weight were not large enough to result in increasing egg weight and extra-large plus large-sized eggs during the early stages of the egg production cycle (20 to 34 wk of age). Increasing dietary protein during the growing period did not have a significant effect on body weight at 18 wk of age or early egg weight.

In the above experiment, the dietary manipulation of nutrients started from 14 wk of age and continued up to 18 wk of age. We speculated that it might be necessary to increase dietary energy and protein from an earlier age than 14 wk in order to be effective in increasing the body weight adequately at the age of housing (18 wk) for improving egg weight and extra-large plus large-sized eggs during the early stages of the egg production cycle. Additionally, we speculated if pullets are provided with more floor space during the growing period than the level that is normally used by the industry, then pullets may have a greater opportunity for feeding activities and, this, in turn, enhances their growth and can be effective in increasing the egg weight during the early parts of the egg production cycle.

The experiment consisted of a 2 x 2 x 2 factorial arrangement of the treatments with two floor space per pullet (45 vs 55 inch^2/pullet), two energy levels (1280 vs 1380 kcal ME/lb), and two protein levels (14.5 vs 17.5%). The dietary methionine was kept at 2% of the dietary protein. The dietary treatments were used from 8 to 18 wk of age. At 18 wk of age, the pullets were transferred to a laying house and fed a layer diet containing 16.5% CP from 18 to 38 wk of age.

Body weight at 18 wk of age was significantly greater for pullets receiving a greater floor space, or fed a higher energy or protein levels. However, the extent of body weight improvement due to these experimental variables was between 20 to 40 g at 18 wk of age. Such improvements in body weight were not adequate to result in improving the egg weight or extra-large plus large-sized eggs during the early stages of the egg production cycle. Egg production performance, egg weight and egg grades were not influenced by dietary regimens for the period of 18 to 38 wk. It is worth noting that pullets grown under a more liberal floor space and fed the higher energy and protein diet were about 100 g (0.25 lb) heavier than their counterparts which were grown under lower floor space and fed a lower energy and protein diet. This information indicates that the potential exists for increasing body weight at the age of housing by increasing the nutrient density of the diet during 8 to 18 wk of age and providing the pullets with a more liberal floor space. However, under the conditions of the Experiment 2, such improvements in body weight still were not resulting in increasing the egg weight and extra-large plus large-sized eggs during the early stages of the egg production cycle.

Because dietary manipulation of nutrients from 14 to 18 wk of age in Experiment 1 and from 8 to 18 wk of age in Experiment 2 were not effective in increasing body weight adequately to result in increasing the egg weight during the early stages of the egg production cycle, in Experiment 3 the effect of dietary manipulation of energy and protein from day-old to 18 wk of age on body weight at the age of housing (18 wk of age) and early egg weight were investigated. Additionally, in this experiment, the effect of two light regimens during the growing period on subsequent performance was investigated.

Experiment 3 consisted of a 2 x 2 x 2 factorial arrangement of the treatments with two light regimens (a short-day vs a step-down regimen), two energy levels (1280 vs 1380 kcal ME/lb), and two protein sequences (high vs low). The high-protein sequence consisted of 22, 18, and 16% CP and the low-protein sequence consisted of 18, 16, 14% CP which were used for age periods of day-old to 6, 6 to 12, and 12 to 18 wk, respectively. The short-day light regimen consisted of 23 h light and 1 h dark (23L-1D) during the first 24 h of age, and then the daily light h was abruptly reduced to 8 h per day and retained at this level up to 18 wk of age. At 19 wk of age (i.e., when the pullets were housed), the light h was increased to 13 h per day and, thereafter, it was increased by 30 min per wk until the daily photoperiod reached 16 h. Thereafter, the regimen of 16L-8D was maintained up to the end of the experiment (66 wk of age). The pullets of the step-down light regimen was exposed to 23L-1D during the first week of age. Thereafter, the light h was reduced by one h per week until it reached 8 h per day at the beginning of 16 wk of age. The light period was kept at 8 h per day during wk 16, 17, and 18. Thereafter, the light regimen was identical to the one used for the pullets of the short-day regimen. Pullets were fed a layer diet containing 16.5% CP during the laying period.

Body weight was significantly increased due to the use of a higher protein sequence at 18 wk of age. Body weight of pullets fed the higher protein regimen during the growing period remained consistently heavier than the pullets fed the lower protein regimen for the entire period of the laying cycle. Body weight during the growing and laying periods was not influenced by the energy levels used during the growing period in this experiment. Pullets raised on a step-down light regimen were significantly heavier than those raised on a short-day light regimen up to 15 wk of age. However at 18 wk of age, body weight was not significantly different among the pullets of the two light regimens. The pullets of both light regimens were receiving 8 h light per day during 15 to 18 wk of age. However, the pullets of the short-day light regimen in contrast to the pullets of the step-down light regimen were not exposed to the postponement of the age of sexual maturity. The greater body weight gain of pullets of the short-day light regimen during 15 to 18 wk of age, in part, was due to a greater rate of development of their reproductive organs (ovary plus oviduct) and their greater liver weight and larger size of their combs and wattles which were vividly noticeable in these birds as compared to the birds of the step-down light regimen. In fact, after reproductive organs were developed in the pullets of the step-down light regimen at a later age, their body weight again remained significantly heavier than the birds of the short-day light regimen throughout the egg production cycle.

Feed consumption and feed conversion for the period of day-old to 18 wk and uniformity at 18 wk of age were significantly greater for pullets of the step-down than the short-day light regimen up to 18 wk of age. The higher feed consumption and the inferior feed conversion of pullets of the step-down light regimen most probably were due to a greater energy need for their higher daily activities due to the presence of more light h per day. Uniformity was not influenced by energy level during the growing period. However, pullets on a high-energy diet consumed significantly less feed during day-old to 18 wk of age and, this, in turn, resulted in significant improvement of their feed conversion. The heavier body weight of pullets on high- protein sequence together with their significantly lower feed consumption resulted in significant improvement of their feed conversion as compared to pullets fed the low-protein sequence. Uniformity at 18 wk of age was not influenced by protein sequence used during the growing period.

Age of the first egg and 50% production were postponed by 10 days for pullets exposed to the step-down than the short-day light regimen. Energy level during the growing period did not have an effect on age of the first egg or 50% production. However, age of the first egg and 50% production were advanced by 2 and 4 days, respectively, for pullets fed the high-protein sequence during the growing period.

Based on the information in the literature during the 1960's and 1970's, we were expecting that the pullets of the step-down light regimen although they would come into production at a later age, their egg production would reach to a higher peak and would maintain a higher persistency throughout the egg production cycle to the extent that their egg production for a similar chronological age would not be different that the pullets of the short-day light regimen, and for a similar physiological age would produce even more eggs than the pullets of the short-day light regimen. In contrast to our expectations, egg production remained significantly lower on an every 4-wk basis and for an average of 18 to 38 wk of age for hens of the step-down than the short-day light regimen. Egg production was not significantly different among the two light regimens during 38 to 66 wk of age, although it tended to be lower for the birds of the step-down light regimen. Overall egg production for the entire experiment (18 to 66 wk), remained significantly lower for birds of the step-down than the short-day light regimen. Hens of the step-down light regimen produced about 18 eggs less than those of the short-day light regimen for age period of 18 to 66 wk. It is worth noting that during the entire laying cycle (18 to 66 wk of age), the rate of egg production remained consistently lower for hens of the step-down than the short-day light regimen. Upon searching the literature, we noted that Ernst and Mather (1992, J. Appl. Poult. Res 1:291-295) also reported a similar finding to our observation. In their study, these investigators grew the pullets under a natural step-down light regimen and housed the pullets at 18, 19.5 or 21 wk of age. Similar to our observation, the age of first egg of the pullets that were housed at 21 wk of age were postponed by five days, their peak egg production was lower, and the persistency of their egg production remained inferior or equal to hens housed at 18 wk of age. The hens housed at 21 wk of age produced seven fewer eggs (hen-housed basis; 18 to 66 wk of age), than the control groups which were housed at 18 wk of age. Apparently the current commercial egg strains are not responding to delayed sexual maturity in the same manner as the birds from 1960's-1970's.

Two points with regard to the step-down light regimen and egg production worth receiving consideration. First, although the Babcock B-300 birds were used in our experiment, the step-down light regimen used is not the one suggested by the ISA-Babcock Breeders, Inc. Babcock recommends a step-down light regimen during the growing period. However, the Babcock's step-down light regimen terminated at 11 wk of age, and, thereafter, pullets are receiving 11-12 h light per day up to 18 wk of age. In our experiment, the pullets exposed to a step-down light regimen up to a later stage of the growing period (beginning of the 16th wk of age). Consequently, the egg production response of the step-down light regimen as observed in our experiment is confined only to our experimental conditions. Second, the producers should be aware that for the sake of increasing the early egg size, the pullets should not be exposed to a prolonged step-down light regimen as used in the current experiment, because this may reduce the annual egg production. Egg production was not influenced by the energy or protein levels used during the growing period.

Egg weight for the period of 22 wk up to the end of the experiment (66 wk of age), was consistently greater for the pullets of the step-down than short-day light regimen. This resulted in the percentage of extra-large plus large-sized eggs for the period of 22 to 38 wk, 38 to 66 wk, and 22 to 66 wk being significantly greater for the pullets of the step-down light regimen than the pullets of short-day light regimen. Small and peewee-sized eggs were not different between the pullets of the two light regimens. As a result of this, the pullets of the step-down light regimen produced significantly fewer medium-sized eggs for the aforementioned periods than the pullets of short-day light regimen. Egg weight or egg grade categories were not influenced by either the energy or the protein levels used during the growing period in any stages of egg production cycle. These results are consistent with the results of Experiments 1 and 2, and indicate that increasing the dietary energy or protein during the growing period may partially increase the body weight at the age of housing, but the extent of increase in body weight is not large enough to result in increasing early egg size.

Although egg weight was increased due to the use of a step-down light regimen, this was not large enough to compensate for the loss of egg production, and as a result of this, egg mass remained significantly lower for the period of 18 to 38 wk, and the entire experiment for the pullets of the step-down than the short-day light regimen. Feed conversion during the laying period has a similar pattern as the egg mass data. Egg weight, egg mass and feed conversion during the laying cycle were not influenced by the energy or protein levels used during the growing period. Growing regimens did not have a significant effect on specific gravity during 22 to 38 wk, 38 to 66 wk, and for the entire experiment. This result indicated that the larger eggs produced by hens of the step-down light regimen have not a lower shell quality.

In short, a series of experiments were conducted to determine whether body weight at the age of housing and as a result of this, egg size during the early stages of egg production can be increased by manipulation of dietary energy, protein and fat, or by increasing the floor space per pullet or using a step-down light regimen. The dietary manipulation of nutrients and the extra floor space per pullet were effective in increasing the body weight at the age of housing. However, the extent of increase in body weight was not large enough to result in increasing the early egg size. The step-down light regimen used in the current study had the potential to increase the early and overall egg size. However, the higher feed consumption and electric costs during the growing period, together with the loss of egg production, anticipated to make the application of this program under most conditions economically unjustifiable in commercial practice. Other step-down light regimens that would not be as severe as the one used in the current study for increasing the early egg size without affecting egg production warrants further investigation.

[Talk presented by Kavous Keshavarz, Department of Animal Science, Cornell University.]

HISTER BEETLES - PREDATORS OF THE FORMIDABLE HOUSE FLY

The house fly is still the primary pest of layer operations in New York State. Considerable research has been conducted at Cornell University to reduce the impact of house fly populations using an integrated approach. This approach presently includes the use of manure management, ventilation, least toxic pesticide applications, parasitoids, mites and most recently, the hister beetle, Carcinops pumilio. Both the adult and larval stages of the hister beetle are predators of house fly eggs and small larvae. These small beetles can consume up to their own weight in fly eggs each day. A recent research focus of the veterinary entomology program at Cornell University has been to determine some of the biological factors affecting beetle behavior and colonization in poultry houses.

Hister beetle adults can be captured in large numbers using black lights (bug zappers) and pitfall traps. However, beetles collected with black lights often display dispersal behavior such as flying and walking from release sites. Recently, IPM Laboratories, Inc., Locke, NY, has developed a device, the Hister House, for capturing adult hister beetles from the manure pits of poultry facilities. Beetles that have been collected using either of these methods can be held for many weeks in cold storage. Presently, we have little information as to the effects of storage on beetle biology.

The veterinary entomology program has been working in collaboration with IPM Labs to evaluate various starvation time periods on the dispersal behavior and reproductive abilities of beetles collected using both trapping techniques. In these studies, beetles were sorted into treatment groupings where food was withheld for 0, 5, 10 or 14 days. Beetle reproductive ability (fecundity) and dispersal were examined for a period of two weeks following the starvation period.

Starvation of beetles initially affected the ability of females to produce live offspring. However, the initial depression of beetle egg laying was not only overcome, but beetles that were starved for the longest periods produced more offspring than those that were never starved. Beetles captured with the Hister House produced nearly 50% more offspring than those captured with black lights.

Nearly 50% of beetles captured using black lights dispersed during the first three days of the study. By the end of the 14 day trial, 60% of black light captured beetles had left the dispersal arena. In contrast, fewer than 10% of the Hister House captured beetles had dispersed during the first three days and approximately 18% of beetles had dispersed by the conclusion of the study.

To determine if dispersal behavior could be arrested, we offered beetles captured using the two trapping methods various quantities of food and examined subsequent dispersal. Seventy percent of black light captured beetles were found to disperse when no food was presented. Fewer than 30% were observed dispersing when abundant food was offered. No differences were observed among feeding regimes with beetles captured using the Hister House.

What this means to the poultry producer is that adult beetles can be trapped prior to cleanout, held in cold storage and released after the house is reflocked with little impact on beetle colonization. Because black light captured beetles disperse more readily and food availability is a determining factor in dispersal behavior, the timing of a beetle release may be more critical if food availability is low. A combination of the two trapping techniques should improve beetle establishment in the manure pit.

*** Producers should be aware of the potential for disease transmission by Carcinops pumilio. Beetles should only be transferred between buildings on the same farm. Insects should not be transferred from houses with known disease problems.**

[Talk presented by Phil Kaufman, Department of Entomology, Cornell University.]