Proceedings

Rockingham Poultry Serviceman's Organization

POULTRY HEALTH SEMINAR

Roanoke-Salem, Virginia
Sheraton Motor Inn
September 15 - 16, 1976

sponsored by

Cooperative Extension Service
Virginia Polytechnic Institute and State University

in cooperation with the

Rockingham Poultry Serviceman's Organization

and

Virginia Department of Agriculture and Commerce

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. W. E. Skelton, Dean, Extension Division, Cooperative Extension Service, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

PROGRAM

SHERATON MOTOR INN

WEDNESDAY, September 15, 1976

8:00 - 9:00 Registration

Morning Session - Chairman, Bob Ford

9:00	Welcome - Bruce Grover
9:10	Future Role of Agriculture - Bob Howerton
9:45	Real Insulation Values - Harold Waite
10:30	Break
10:45	Poultry Pest Control - Jim Roberts
11:15	Major Avian Diseases of Economic Importance - Kenny Page
12:00	Lunch

Afternoon Session - Chairman, Winston Turner

1:30	Hatchery Management - Willard McFayden
2:15	Broiler Management - Tom Hester
3:00	Break
3:15	Turkey Management - Joel Coleman
4:00	Broiler Breeder Management - Paul Souder
4:45	Discussion
5:00	Break

Evening Session - Chairman, Bruce Grover

6:30 Program - Mr. Les S. Willson "I Can't Hear You, The Water's Running"

THURSDAY, September 16, 1976

Morning Session - Chairman, Bruce Grover

8:45 Relationship of Insulation in the Restricted Feeding of Commercial Layers - Skeezix Coles

9:30 Mycoplasma Infections - Stan Kleven

10:15 Break

10:30 The Diagnosis of Diseases Involving the Bursa of Fabricius - Kenny Page

11:15 Proper Usage of Animal Health Products - John Farnham

12:00 Insulation Report - Harold Waite

12:30 Adjourn

This program has been planned by the Rockingham Poultry Servicemen's Organization.

Bruce Grover - President
Winston Turner - Vice President
Sheldon Burkholder - Secretary - Treasurer

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Richard Eaton	Holly Farms
Bob Ford	Upjohn
Bob Johnson	Rocco
Suresh Singh	Rockingham
Leroy Thompson	Heatwole
Walker Thompson	Wampler
Cliff Douglass	VPI&SU
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CONTENTS

THE FUTURE OF AGRICULTURE

R. E. Howerton

Let me ask your indulgence for the next few minutes to do a bit of patriotic reflecting about our country and about the importance of agriculture in the foundation of these 50 states.

A while back, I read a creed that seems more and more appropriate to our business of agriculture -- yours and mine. The creed went like this:

1. We believe in our land.
2. We believe in the people of our land.
3. We believe herein lies the strength and future of our country.

   Let me repeat it:

4. We believe in our land.

   We believe in the people of our land.

   We believe herein lies the strength and future of our country.

Reflect historically, if you will, on how so many of our country's great events were originated by and resolved by people of the land. People whose inspiration and education was founded in agriculture. From Washington and Jefferson to Lincoln to who knows. People of the land. Patriotic people who love the land and America. Productive people who have little trucks with a 40-hour week or guaranteed wage, who believe and participate in the risks and gains of the free enterprise system.

Gentlemen, we people of the land are proud people. How do you feel about living in the best clothed country in the world? The best fed country in the world? And the healthiest country in the world? Proud?

People of the land should be proud of the continuing role and involvement in providing these benefits to all American citizens. In fact, everybody in the Ag Community should be proud of the efforts that provide these benefits.

Who lives in this Ag Community? Think about a woman working the processing line. Is she proud of her production team? Perhaps so. But is she proud of the Ag Community? Does she even know that she's a part of the Ag Community? I doubt it. But we know she is. Just what is this Ag Community? Who belongs to this not so exclusive group? Well, I see the Ag Community as all of those individuals involved in production, processing marketing, distribution, communication and research of ag products.

Certainly, the first member of this community is the farmer. The man who makes up less than 5% of the nation's population and receives credit for feeding the rest of the country and part of the world. Think about that .... the farmer actually makes up only one-sixth of the total agriculture community, 30% of the population actually engaged in agriculture.

There are Extension workers, chemists, breeders, equipment engineers, computer programmers .... they are part of the Ag Community as I see it. But do they know it? It's doubtful in some cases.

There are conservation workers, economists, the man on a tractor assembly line, a truck driver hauling corn into Texas and back hauling watermelons. Do you think the trucker knows that he's a member of the Ag Community? I doubt it. He might think he's a member of the teamsters union and nothing more.

What about the sacker in the feed mill, or the feed salesman or the woman on the production line watching a hot dog machine turn out hundreds of the American miracles per hour? Yes, even the dock workers loading soybeans for shipment to Japan and the press operators and editors of farm publications disbursing information to the farmers. All of these people are members of this Ag Community. But do they know it? Should they know it? Should they be proud?

Yes, the entire agricultural community has every right .... no, it has every responsibility, to be proud of the collective achievement, because Ag pride is Ag power. The combination of research, education and excellent products provided by our community has made American agriculture the envy of the world.

Ag power has provided our nation with a standard of living unmatched in history. No society has ever been so well fed, so well clothed, and so well housed. And, Ag power is the foundation that makes this country great. Ag power has satisfied our people's basic needs through the free enterprise system because this system has encouraged and motivated men and companies to excel. The Ag Community has accepted the challenge of the free enterprise system and remains one of its greatest supporters.

We have another real challenge and that is to build and to expand pride in our agricultural community. But, you may say, why do we need to build pride? After all, our industries have been speaking out on behalf of farmers for years. So, why do we need to build pride in the Ag Community? Probably, because, the most important reason for extending pride in the agricultural community is to make those people who are not aware of their role, more aware and involved. Everyone from the chairman of the board to the janitors. You and I must perpetuate Ag pride. Let's tell that trucker, the accountant, the girl on the process line .... let's tell everyone just how important their contribution is to our community and our future.

Our charge? To extend pride in the entire agricultural community. To build Ag power so they too will speak out. This then, is our purpose -- our long-range plan with a goal -- and that goal is to keep America the best fed, the best clothed, the healthiest and the freest nation in the world with a strong and proud agricultural foundation.

With this purpose in mind, we have a responsibility; a responsibility to tell every man, woman and child, inside as well as outside of the agricultural community about this Ag power that we have.

Yes, we have a purpose and we have a responsibility, but neither can be successful if we don't have integrity. No other community or industry has such a history of integrity. In our venture we must maintain this integrity if we're to be successful, because true pride and true Ag power can never be obtained without individual and collective honesty.

Our nation has grown because the Ag Community has been a consistent provider of food, clothing and shelter. It is the dependability of agriculture that will continue to make our country a growing country by freeing manpower and other resources for added technological advancements. The citizens of America, the citizens of the world, depend on us to maintain these consistent levels of productivity. The moral obligation here is heavy and it must be shared by all.

So now it's time for the Ag Community to stand up and be recognized. It's time to point out to those who criticize that their basic needs are being simply and economically satisfied by agriculture. It's time that we extend pride to all members of the agricultural community. And it's time to be optimistic about our future and optimistic about our importance. It's time to change this concept of a 5% minority into a 30% majority that has a real voice in this country and the world. You and I are the people who can energize this purpose, this responsibility, this integrity, and this dependability and we must do it with enthusiasm for enthusiasm makes us great and strong. It's the one thing that will strengthen pride, and Ag pride is Ag power.

Yes, we people of the land are indeed blessed and we people of the land are indeed proud of our heritage and our contributions to America and it's citizens. We can extend this pride to the non-believer if we become V.I.P. --

Very Involved People -- and try like Ben Hogan who said to a man who told him that he would give one-half of his life to play like Hogan. Ben replied, "I have given mine, and all my heart."

I'd like to ask you to try to talk to the uninformed about "what's right with agriculture" -- about Ag power -- about Ag pride. We at Elanco intend to do even more. We invite you because we believe this ..... United We Stand.

REAL INSULATION VALUES

Harold J. Waite

Specifiers have a tendency, and rightfully so, to take a published R-value, or R-value obtained from an independent laboratory, as being a finite or absolute value for determining the thickness of insulation to use for a given application. Insulation material suppliers need standard conditions to obtain a value for comparative purposes. However, unless you read the fine print you do not know what was actually tested or if that value applies to the application intended or under the conditions in which the insulation will operate within your facility. As regulations governing heat loss through building walls and roofs become more prevalent, it is essential for you to know and understand insulation better.

Generally a K-factor or an R-value will be published. This will be based on a K-factor arrived at by subjecting a 1-inch-thick sample that is completely free of moisture to tests in the dry condition at a given pre-set mean temperature, generally 75^{o}F. What this value may not tell you is the real insulation value in use. R-values are normally calculated figures taken from tested K-factors. This is why the actual material in the full thickness should be tested. There can be changes in the calculated R-value based on the way the insulation is placed into a system.

Probably more important, particularly in regard to rigid plastic foams, is the age of the sample. From the as-manufactured condition, most rigid plastic foams have a noticeable change in the real insulation value. Here is a typical curve for a polystyrene foam and a typical curve for a urethane foam (see Figure 1). These are aging curves based on 1 inch samples at a specific temperature. Thicker samples of impervious facings would give you different aging characteristics. However, ultimate aged values should be similar. Nevertheless, the aged value is the real value of insulation that an owner should use in designing his facility.

Figure 2 shows the effects of the average or mean temperature existing. As you can see, if the average temperature of your facility, say for Richmond, Virginia, is 65^{o}, then this is the value that you should use in your design. Don't use a published value for 75^{o} mean.

A most important variable that a published K-factor does not indicate is the effect of moisture content of an insulation on the real insulation value or actual resistance value. Small percents of moisture can have a significant effect on the real insulation value and can reduce your R-value substantially (see Figure 3). Samples tested directly from installations will show you this. Simulated tests (guarded hot box) with mineral wool show that an installation without a vapor barrier on the interior can decrease insulation value. An ineffective vapor barrier can be one with slits or narrow openings. An effective maintenance program is essential with this type of insulation system.

There are other factors such as through metal projections, metal attachments, compressed areas of material, or actual degraded areas of material that would also effect the real insulation value. The following table is typical of what happens to mineral wool batts that become compressed for whatever the reason:

Thickness	Apparent Density	Total R-Value
3.5"	0.8	10.54
2.5"	1.1	8.39
1.0"	2.8	4.54

Even though the original material is there, you have changed the shape of the mechanisms within the material that resist the heat transfer. Various associations have done testing of roll-on blanket type insulations in metal buildings and found that significant differences do result between uncompressed and compressed insulation.

Also one thing to remember is that most published values are typical or average. The material you get, unless from a reliable supplier, might not be the same as the material tested or described to you. Be sure to obtain clearly published literature and specifications. Figure 4 shows a curve of R-values versus density. Density of a given type of rigid foam is not all encompassing but can be a factor in indicating the real insulation value of a material. This is particularly true of molded beadboard polystyrene foam of 1 lb. per cu. ft. density. It is something you can also check easily to see if you are getting your money's worth. If on the low side, it can serve as a red light for more serious checking.

I hope by reviewing this you don't get the opinion that manufacturers are trying to deceive or mislead you. A published K-factor or published R-value is established by an ASTM standard test method and is the standard industry way of publishing a comparative value under a given set of conditions so that you can compare one insulation to another for those specific conditions.

What does all this mean? At one time, it really didn't matter that much if the insulation value deviated somewhat from design. You could slough this off as slightly inferior insulation, but it was cheap. All you had to do was turn up the heaters a little higher and pump a little more power into the operation. You probably over-designed the heater system anyway. However, cost of utilities have become a significant part of the operating budget and you can no longer afford that luxury. You had better know why your bills are high and getting higher. Don't blame it all on inflation--investigate. To illustrate a point, take a typical broiler house 40' wide, 300' long with 7' high side walls. Assume an inside temperature of 70^{o} and an outside temperature of 5^{o}. Assume an insulation in the ceiling of R-8 and insulation in the walls of R-5. Your heat loss in this case would be 154,400 BTU/hour. If these R-values were to decrease by 25% and the ceiling were to have an R of 6 and the wall insulation an R of 3.75, your heat loss would increase by 1/3 to 205,867 BTU/hour. Multiply this additional heat loss by the number of hours/year times the cost of heat and you've added an annual cost of $2,333. This might not seem like a lot of money, but why throw it away when you can save it by a little careful consideration of your insulation system.

Understanding the real insulation value and knowing how to design systems for maximum utilization of an insulation material is important. Take the following example: In a metal building where a roll-on blanket-type insulation is installed over the purlins and then the metal siding installed, the insulation is obviously compressed at the purlins and also to some degree approximately 6 inches from each side of the purlins. This naturally results in a reduced total R-value. Take our typical 40' wide building. Assume the top flanges of the purlins are 2½ inches wide located on 5' centers and assume the insulation is only 15% effective over the purlin and 75% effective 6 inches each side of the purlin. By taking the actual loss of R-value in these areas and calculating the percent of the total area involved, you can get a 10% net reduction factor in the overall R-value of the total insulation system. Some of the metal buildings manufactured have a good way of solving this by placement of a rigid foam insulation immediately over the top of the purlins to maintain the effectiveness of a blanket system and protect it from this type of structural loss. Know the latest insulation developments.

Some poultrymen are monitoring entire buildings, buildings that contain different insulation systems as well as different ventilation methods to determine the best system for temperature and humidity control. Temperature and relative humidity are recorded continuously. The average highs and lows and the flux are then compared. Two nearly identical brooder houses (40' x 400') one containing 1" of skin-type extruded polystyrene (published R=5.41) and one containing 3½" batts and vapor barrier (published R=11) are being monitored in the southeast area. The following is being compared: Total bird weight, number of processed birds, average bird weight, feed conversion, feed used, fuel used, average high and low temperatures, average high and low relative humidity. They are also monitoring the buildings to see what changes there are with time; changes within a given flock or changes over a number of flocks. Conclusion to date: A better insulation system with an apparent lower R-value can perform as well or better than an insulation system with apparent greater R-value.

How is the insulation performing in your facility? Do you really know? If you can't monitor the entire building, there is a way that a small sample can be checked. The value you obtain is not as finite a number as you will read in published literature but it is particularly effective as a comparative value if you happen to have different types of insulation systems in your facility. It will give you an actual value. Check one sample versus the other under the same testing conditions and test equipment. Accuracy may be only plus or minus 5%, but it is the actual real insulation value of that particular sample taken directly from an operating installation.

One piece of equipment that does this is a k-factor measuring instrument. It operates pretty much as the laboratory testing facility equipment does. It has a cold plate and a hot plate that, in effect, put a temperature differential across the sample. However, the sample is generally not preconditioned or dried out before testing. That is why during testing of the sample you can have a changing k-factor and a varying value. However, it gives you a very fast read-out; in many cases fast enough so that the moisture is still in the sample. However, as the moisture leaves the sample, the k-factor improves as it becomes drier. Again, this can show you what effect moisture has on insulation. The instrument will also check samples from 3/4" up to 3-1/4" thick. It can read k-factor direct or the C-factor which is the inverse of the R-value. With insulation materials, surface co-efficients are insignificant. Surprisingly, the equipment is really quite accurate. It is well insulated from edge effect. If you were to observe it you would see that there is some drift but over short periods of time, the average figure that flashes up on the gauge is quite reliable within a given drift period. The equipment is checked against a National Bureau of Standards tested sample and is calibrated periodically between samples to match the value of this known sample.

The equipment is portable; it can be used in the field and, as many of you know, we have the equipment with us here and are testing samples. We have asked poultry servicemen to bring samples with them and to identify each by:

1. Product brand name.
2. Rated thickness (and/or R-value).
3. Age of sample.
4. Area from where sample was taken (end use of building, i.e. layer house, brooder house, etc).

We will evaluate and complete all the samples brought in. A report is attached for the servicemen's use.

This presentation has dealt mainly with the real insulation value. This, naturally, is the most important thing to consider over a long period and is particularly significant as utility costs keep rising. However, in selecting an insulation material, many things should be considered in addition to insulation value. Some of these are: Overall appearance and maintenance of this appearance, maintenance costs in keeping the insulation in tip-top performing condition, steady long-term performance over many seasons, its structural integrity within the system, and cleanability.

Various insulations as well as other building materials are combustible and should be properly installed. Because of this, it must be recognized that some degree of fire risk exists in most agricultural buildings. The risk can be reduced, however, by assessing the potential fire hazard realistically; then applying suitable safety precautions, and establishing and maintaining good building management. Appropriate manufacturer's recommendations should also be followed.

In conclusion, in regard to insulation and insulation systems, an important element to remember is that initial cost is not as important as it may have seemed at one point in time because, if you improperly insulate, it will not perform as expected in the long run. Improper insulation will, in fact, cost you by not saving you the money you can expect from a properly designed insulated building. It is difficult and expensive to add insulation to existing buildings as you may already know.

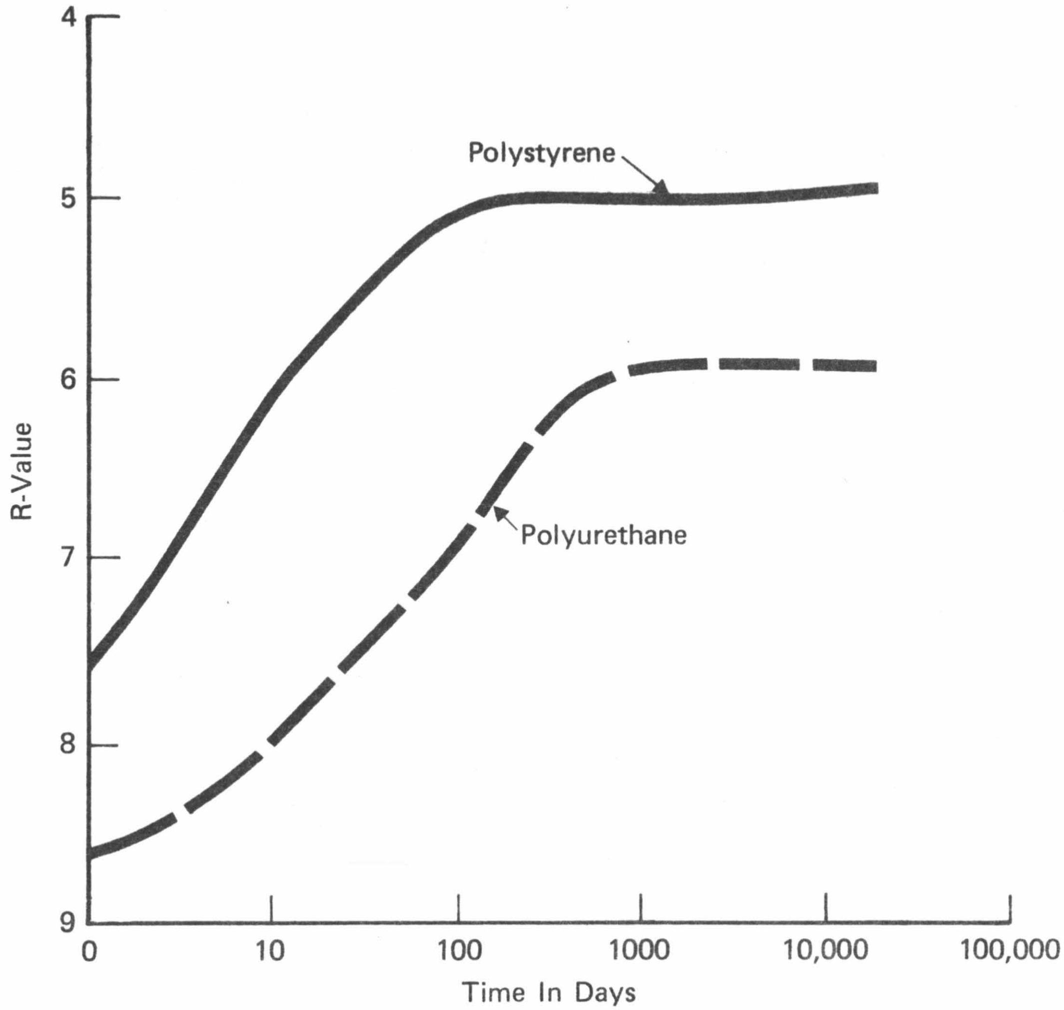

FIGURE 1, Effect of aging on R-value

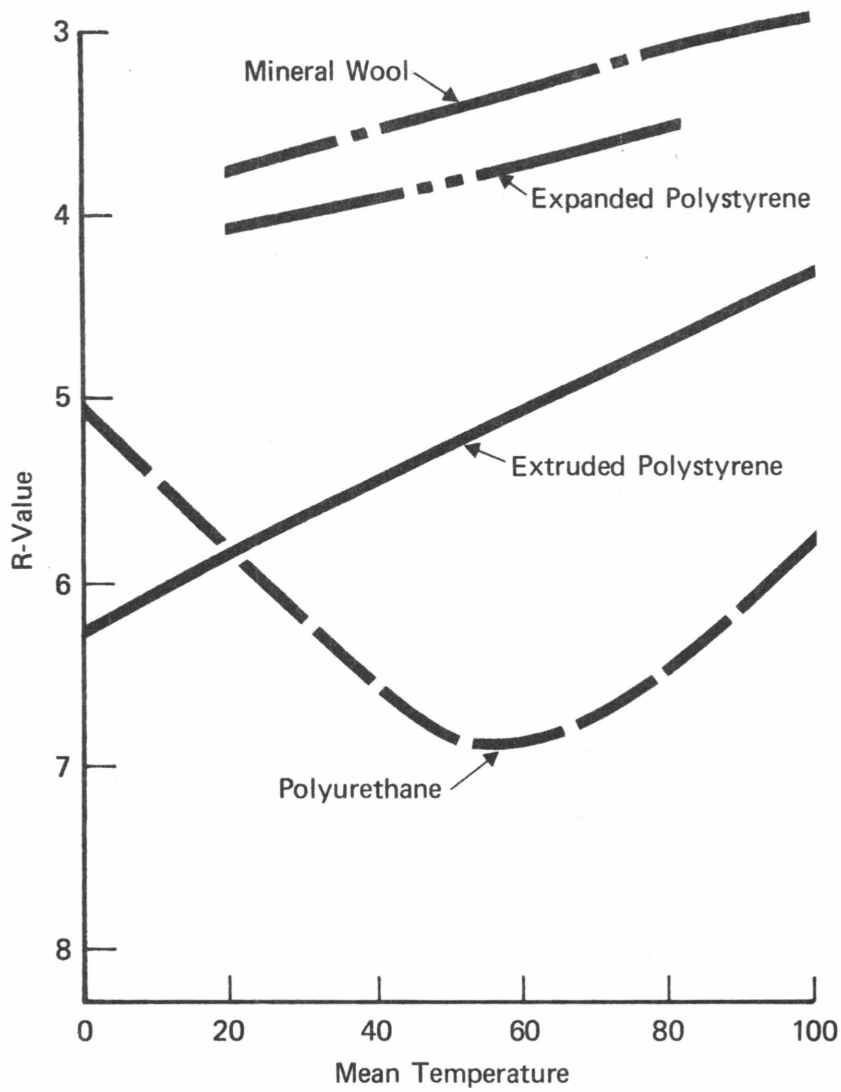

FIGURE 2, R-value versus mean temperature

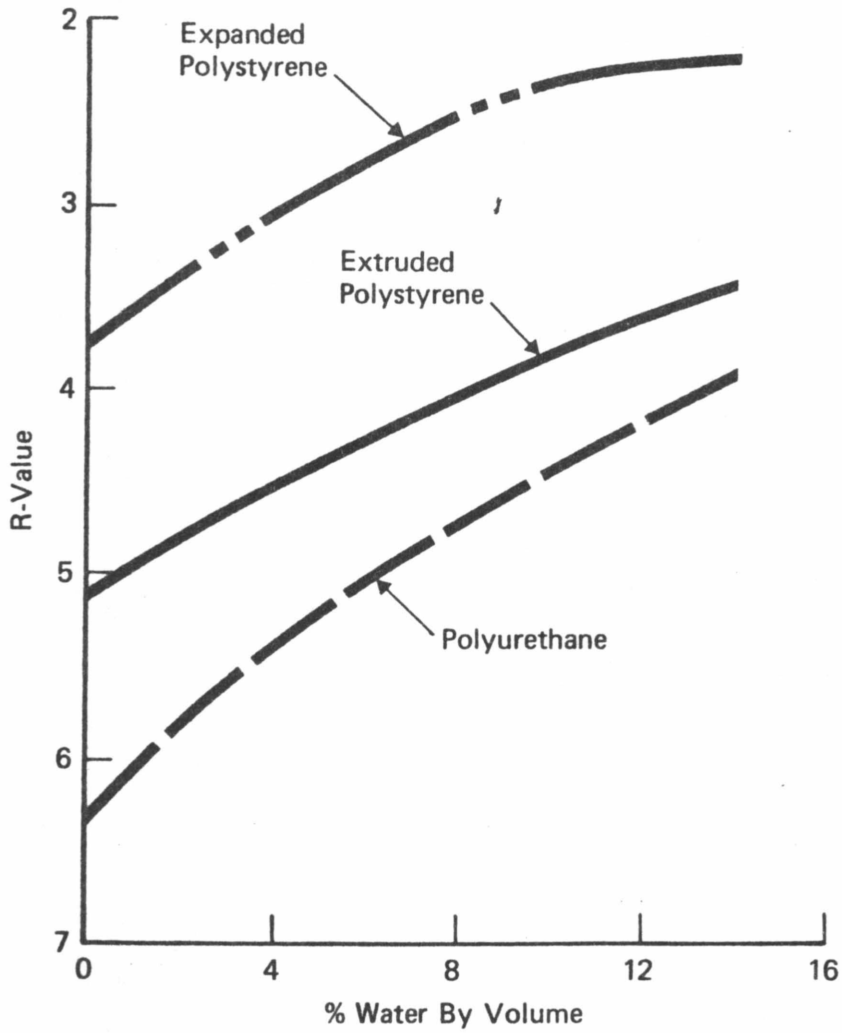

FIGURE 3, Effect of water on R-value

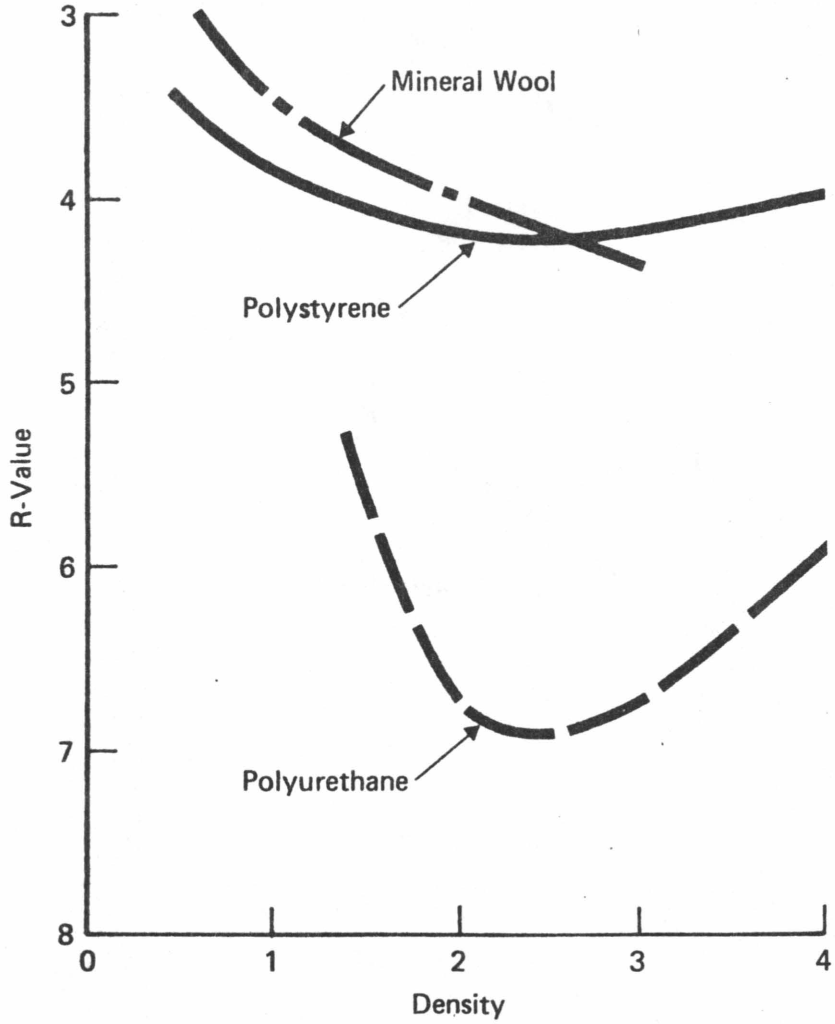

FIGURE 4, Effect of density on R-value

POULTRY PEST CONTROL

Jim Roberts

The common house fly is a thoroughly cosmopolitan and domesticated insect and is present at one time or another in nearly every habitation in the world. Its numbers generally represent 98 percent or more of the flies commonly collected in dwellings.

In addition to its disagreeable presence and habits, the house fly has long been suspected as a vector of human and animal diseases. Its disgusting habits of walking and feeding on garbage and excrement and also on the human person and food make it an ideal agent for the transfer of disease organisms. It has been shown that house flies are naturally infected with the pathogens of more than 20 human diseases, and many authorities believe that the fly is an important vector of typhoid fever, epidemic or summer diarrhea, amoebic and bacillary dysentery, cholera, poliomyelitis, and various parasite worms. However, adequate epidemiological evidence is available only for bacillary dysentery, where it has been shown that the incidence of the disease can be reduced by fly control.

In the more northern parts of the United States, house flies winter chiefly as larvae or pupae in their puparia beneath manure piles, and in other breeding grounds. In heated buildings some adults probably survive and in warm dairy barns and in warmer parts of the earth it continues to breed slowly throughout the winter. The house fly combines a large family with one of the shortest life cycles known among insects. From 100 to 150 eggs are laid at a time, and from two to seven such batches may be deposited by one female, so that a total of 500 eggs from one fly is probably a normal production. The record as far as is known, is 21 batches, or a total of 2,387 eggs, from one fly. The whole life cycle from egg to adult may be completed in from 6 to 20 days and a new generation started in from 2 to 20 days more. The length of the various stages under favorable conditions is somewhat as follows: Egg: 8 to 30 hours; Larva: 5 to 14 days; Pupa: 3 to 10 days; Adult to eggs (preoviposition period); 2¼ to 23 days.

Most house flies come from animal manure. It is in this substance that they prefer to lay their whitish elongate eggs, 25 of which, end-to-end, reach 1 inch. A young house fly is not a miniature of its parents but is the legless, footless, and almost headless, white maggot familiar to every boy who has cleaned the manure from stables. The larvae of house flies are believed to feed upon the microorganisms which cause fermentation and decay. Hence, they live only in moist masses of organic matter which are warm enough to promote the growth of these organisms. Feeding on this material, the maggot reaches a length of 1/3 to 1/2 inch in a few days, and then forms a seed-like chestnut-colored puparium of its third larval skin, within which the change to adult takes place. Before forming the puparium, the larva migrates to some drier part of the substance on which it fed.

While horse manure is preferred, they can develop in any moist, warm, fermenting, organic matter, ranging from piles of grass, decaying fruits or vegetables, garbage, and waste about feed troughs, to human and animal excrement of all kinds.

The presence of house flies is an indication of our failure to dispose properly of manure, garbage, sewage, food wastes, human excrement, dead animals, or other organic waste. Therefore, proper environmental sanitation is fundamental to successful fly control. Fly breeding can be prevented by simple practices of burying such organic matter, as in the cut-and-fill method of garbage disposal, or by drying it so that its moisture content is below that required for larval development, as is the ultimate result in modern sewage-disposal facilities.

However, under situations such as cattle feed lots and poultry farms where birds are caged above the ground, the accumulation of manure is so great as to make satisfactory fly control a major problem. A one-half-ton manure pile, after being exposed for only 4 days, was found to contain an estimated 400,000 fly larvae, or 400 flies to the pound. Manure removed from such localities should be hauled away every 2 or 3 days and scattered thinly over fields. Manure is most valuable as a fertilizer when fresh, and the common practice of storing it in the barnyard results in the loss of 25 to 65 percent of its fertilizing value in 6 months' time, because of leaching and hot fermentation. More important, flies cannot breed in the thinly scattered material because it dries out and there is no fermentation. After manure is well rotted, flies are not attracted to it to lay their eggs. In instances where it is not practical to remove manure, methods which promote its rapid drainage and drying are of value. The breeding of flies in stored manure can be largely prevented by making piles with straight sides and clean margins and covering the entire pile with heavy building or roofing paper so that the heat developed underneath kills the larvae.

POULTRY LICE

Contrary to the belief of most poultrymen, the lice that live on fowls do not suck blood. They feed by nibbling or chewing the dry skin scales, feathers, or scabs on the skin. The irritation from the mouth parts, together with that of the sharp claws on their feet in running about over the skin, results in nervous condition of the infested birds that prevents sleep, causes loss of appetite and diarrhea, and renders the weakened fowls easy prey for various poultry diseases. Young chickens and turkeys that are brooded by lousy hens are often killed in great numbers by the swarming of lice from the hen to them almost as soon as they hatch from the eggs. The most serious effect upon older fowls is a reduction in the number of eggs laid. Infested fowls are in a mopey, drowsy condition with droopy wings and ruffled feathers, refuse to eat, and gradually become emaciated. If the feathers of such fown are parted, the lice will often be found running about on the skin in great numbers, particularly below the vent, on the head, or under the wings.

Poultry lice generally breed faster and become more abundant in summer than in cold weather, but all stages can usually be found on the host in winter. All these chewing lice are permanent parasites, spending all life stages, generation after generation, on the same bird, and never normally leaving its body, except as they pass from one fowl to another, particularly from old to younger birds. The eggs are cemented fast to some part of the feathers. While laid singly, they may be abundant enough to form dense clusters on the fluffy feathers of badly infested chickens. In a few days or weeks the young nymph hatches from the egg in a form much like the parent lice only much smaller and paler in color. It at once begins running about and feeding, and in the course of the next few weeks passes through several molts, gradually assuming the size, form, and coloration of the adult.

Poultry lice are entirely wingless, six-legged insects with a much flattened body and broad head rounded in front. The mouth parts are near the middle of the underside of the head, the most prominent parts being two sharp-pointed teeth or mandibles. The legs are good-sized, and, in all of the species that live on birds, they have claws at the end of the tarsus.

The chicken head louse is especially noticeable and injurious on young chicks and turkeys. The dark-gray large-headed adults, about 1/10 inch long, and the paler young ones are found standing head-down along the base of the feathers on top of the head with their mouth parts against the skin. They constantly nibble at the skin scales but apparently never eat through the skin or into the flesh. Although they move about only a little, they pass very early from brooding hens to little chicks, which are often killed by them. The eggs are cemented to the barbs of the down or small feathers of the head or neck. They hatch in about 5 days and the young are full-grown in about 10 days more.

The chicken body louse lives most of the time on the skin of either chickens or turkeys, being especially abundant about the vent and under the wings, and is common on both young and old fowls. When the feathers are parted, all sizes of the lice run rapidly to cover. The smaller ones are pale yellowish white but the larger ones, which reach a length of nearly 1/8 inch, appear brownish. The body is covered with fine long hairs. Bishopp and Wodd consider this the most injurious louse of grown chickens, because it is constantly on the skin. The eggs are fastened to the basal barbs from the shaft of the feathers, especially below the vent. They are said not to hatch on feathers dislodged from the host. On the body they hatch in about a week, and 10 to 12 days of growth brings the nymphs to the adult stage. They increase very rapidly: Lawson and Manter record having counted over 35,000 lice on one chicken, which they think was not half of those actually present.

The shaft louse, small body louse, or common body louse is similar to the large body louse in appearance, but it is distinctly smaller (1/16 inch long), paler colored, and less hairy. It has commonly been considered the most injurious louse of chickens, but Bishopp and Wood contend that it lives mostly on the feathers, lying along the shaft and running down the feathers to the skin when the feathers are parted. It is very common about the vent, also on the back and breast. It does not infest young chicks, presumably because of the lack of well-developed feathers. The eggs are fastened to the base of feathers and hatch in 2 or 3 weeks. These lice are very hardy, having been kept alive for 9 months. This species occurs on ducks, turkeys, and guineas, at least when they are housed with chickens, and is sometimes troublesome to horses stabled near badly infested poultry.

The other lice on chickens are generally less abundant and live chiefly among the feathers, where their nibbling and crawling are not as annoying. These include the fluff louse, which is found among the fluff under the vent and is about 1/16 inch long; the chicken head louse and the brown chicken louse, both about 1/10 inch long; the large chicken louse, which is about 5/32 inch long; and the wing louse, a very slender species about 1/10 inch long, which lives among the barbules of the wing feathers. The lice that attack turkeys, geese, and ducks are said to be less abundant and generally not sufficiently injurious to require special treatment.

BED BUG

The common bed bug and several of its close relatives are frequently pests in poultry houses. They hide, breed, and lay their eggs in nests, behind nest boxes, under loose boards, and in cracks about the walls, roosts, and roof of the building. At night the nymphs and adults find their way upon the sleeping hens and suck their blood. They are almost never found on the fowls in the daytime. Sitting hens suffer especially from these pests and may be driven to leave the nests. The small black spots of excreta from the bed bugs may often be seen on the eggs and about cracks.

STICKTIGHT OR SOUTHERN CHICKEN FLEA

In the South and Southwest, poultry sometimes show clusters or dark-brown objects about the face, eyes, ear lobes, comb, and wattles made by hundreds of small flattened fleas that have their heads embedded in the skin so that they cannot be brushed off. Young fowls are often killed, and egg-laying and growth are greatly checked by the loss of blood and the great irritation caused by the bites. The ears of dogs and cats often become lined with them. Hosts include chickens, turkeys, and other poultry, and also cats, dogs, horses, and man.

NORTHERN FOWL MITE OR FEATHER MITE

Small reddish or brown eight-legged mites swarm over the skin, congregating about the vent, tail, and neck. The feathers become dirty from the eggs and excreta of the mites, and the skin becomes irritated and scabby. As a result, egg production is decreased and in severe infestations the fowls may be killed.

Hosts include chickens and other domestic fowls, English sparrow, starling, pigeon, and a variety of wild birds. These mites are generally distributed throughout the United States.

The eggs are laid in the fluff feathers, and are also found in the nest. Hatching occurs in 2 to 3 days, and the larval stage lasts about 9 hours. The mites become adult after about 4 days. The adult mite resembles the poultry mite in a superficial way but is slightly smaller, more hairy, and with smaller legs. It moves more rapidly, and the tip of the female abdomen has a slight notch. In habits, the northern fowl mite is very different, since it lives entirely on the body of the fowl instead of harboring in cracks about the poultry house.

SCALY-LEG MITE

This species and the following one are close relatives of the mites discussed earlier, but their habits are quite different. They are more like mange or itch mites, since they remain on the body all the time and make tunnels in the skin, in which the eggs are laid. The scaly-leg mite attacks especially the feet and lower part of the legs but is also found about the comb and neck. The scales of the legs become elevated, and a fine white dust sifts from beneath them. Lymph and blood exude and red blotches form on the legs. The birds become crippled or even unable to walk at all. Great irritation must result from the burrowing of the mites. Animals attacked are poultry and wild fowls; and rabbits, guinea pigs, and other animals housed near infested birds.

These tiny, eight-legged mites, measuring from 1/100 to 1/50 inch across, are pale gray in color and nearly circular in outline. They are not seen by the naked eye. If the fowl's legs are soaked in warm soapy water, the scales may be lifted and the mites found by use of a microscope among the powder and and lymph from beneath the scale. They have very short legs and the skin is traversed with fine lines as in the palm of one's hand. It is believed that the eggs are laid in the tunnels made by females beneath the skin scales. Like other mites, the young are at first six-legged and the development from that point on is a simple metamorphosis.

LESSER MEALWORM

The lesser mealworm is black or a very dark reddish-brown and measures from 3/16 to 4/16 of an inch in length. The larva is yellowish-brown. It is cosmopolitan in distribution and is commonly found in flourmill basements in damp or musty flour or grain. It prefers grain and cereal products that are slightly out of condition.

INDIAN-MEAL MOTH

This is one of the most general and troublesome of the moths infesting stored products. Infested material will be more or less webbed together and often fouled with dirty silken masses containing the excreta of the larvae.

This insect attacks all kinds of grains, meal, breakfast foods, soybeans, dried fruits, nuts, seeds, dried roots, herbs, dead insects, museum specimens, powdered milk, the excrement, exuviae, and pollen in beehives, and many other substances.

In unheated buildings, the insects winter as larvae, but in warm situations feeding and breeding are continued. The adult moth is about 1/2 to 3/4 inch from tip to tip of wings and is active at night or in dark places. The entire life cycle of the insect will require from 4 to 6 weeks under conditions usually encountered in heated buildings, there being from four six generations of the insect each year.

Larvacides for control of maggots in droppings under caged layers. Use in accordance with directions on label. AVOID DRIPS FROM WATERING DEVICES. ELIMINATE ALL EXCESS MOISTURE.

Coopers' Residual Surface Spray and Larvacide (Excellent for cleanup of soldier fly larvae)

Cygon or DeFend

Rabon

Ronnel (Korlan)

Residual surface sprays for control of adult house flies. Use in accordance with label.

Dibrom

Korlan

Malathion

Rabon

Space treatments for control of adult flies in poultry houses; especially house flies. Use in accordance with label.

Pest Strips (Vapona)

Synergized Pyrethrins

Baits for control of adult house flies. Use in accordance with label. Ready-to-use baits.

Bagon

Ronnel

Vapona

Other

Make your own baits by mixing insecticides with sugar or molasses. Use commercial grade blackstrap molasses.

Dibrom

Malathion

Control of insects on poultry (caged layer treatments). Use in accordance with label.

Co-Ral Dust

Co-Ral Spray

Malathion Dust

Malathion Spray

Rabon Spray

Sevin Dust

Litter treatments. Use in accordance with label.

Sevin Dust

Co-Ral Dust

Malathion Dust

Rabon Dust

Rabon Spray

Darkling beetle control. Use in accordance with label.

Ronnel (Korlan)

Sevin - Total legality is dubious

Indian meal moth control. Use in accordance with label.

Malathion Surface Spray. (Resistance has been reported in north central states).

Pest Strips (Vapona) in closed non-ventilated areas.

CURRENT DISEASES OF ECONOMIC IMPORTANCE IN THE POULTRY INDUSTRY

R. K. Page

Control or eradication of many of the economically significant avian diseases has resulted in recognition of disease problems previously thought to be insignificant. Eradication of mycoplasma gallisepticum for example; led to the recognition of mycoplasma synoviae as a cause of air sacculitis in broilers. When one looks at the major disease problems currently being seen, there are several which are currently causing problems.

A. Broilers

1. Viral arthritis

   Viral arthritis is most frequently seen as a cause of excessive trims in large males. Enlarged hemorrhagic gastrocnemius tendons dorsal to the hock are frequently seen in males at the processing plant. Agar gel precipitin testing of broiler breeder flocks has indicated parenteral antibody against viral arthritis is very important in preventing viral arthritis in their progeny.

2. Clostridial Infections

   Frequently overlooked as a cause of problems, these anaerobic bacteria are very important as a cause of chronic disease problems frequently resulting in sep/tox condemnations in the processing plant. Clostridium botulinum is currently causing severe problems on selected farms. An accurate early diagnosis is important to prevent this disease from becoming chronic on a farm. Thorough clean-out and the use of an appropriate insecticide to control the darkling beetle are essential in the control of this problem.

3. Dermatitis

   Feather sexed males grown in the hot humid summer months on rations low in the sulfur-containing amino acids have been found to have excessive cuts and abrasions at processing. Good debeaking along with a reduction in light intensity and elevation of the sulfur amino acids has been helpful in alleviating this problem.

4. Mal-absorption syndrome

   Although the etiology of this syndrome has not been determined, a definite clinical syndrome does exist. The lesions consist of swollen friable intestinal tracts with excessive mucus and hemorrhages on the lining, diarrhea paleness and hemorrhages in the muscles. Increased contamination at processing and elevated feed conversions are constant findings. Corn with a moisture content in excess of 14% is usually found when this syndrome occurs.

5. Chick quality problems

   Chick quality problems have been commonly found during the warm humid summer months. Frequently related to a given breeder flock due to poor hen-house and egg management. The syndrome is characterized by high early mortality, lingering vaccination reactions, and elevated sep/tox condemnations.

6. Tibial dyschondroplasia

   This is a very common finding in broilers in our area. Frequently described as a genetic disease under nutritional influence, it is characterized by poor calcification of the epiphyseal plate of the tibia. Chronic lameness and osteomyelitis are frequently seen as a sequelae to this problem.

7. Mycotoxicosis

   A wide variety of mycotoxins are now being recognized as a cause of chronic diseases in the avian species. There is growing evidence that Fusarium T-2 toxin is associated with mal-absorption syndromes in broilers. Ochratoxin can cause severe mortality problems in birds as can aflatoxin which has been extensively studied.

B. Turkeys

Turkey disease problems have diminished with the advent of the low virulent fowl cholera vaccine.

1. Hemorrhagic enteritis

   This disease is frequently seen in turkeys on certain farms. Characterized by massive hemorrhaging into the lumen of the intestinal tract and sudden death; this disease can be prevented with the HE vaccine currently available.

2. Liver abscesses

   This chronic problem has caused the condemnation of large numbers of livers from some turkey growers. A wide variety of bacteria have been isolated from these livers; however, they are thought to be secondary invaders. The problem is usually seen in birds on high energy rations and doesn't appear to follow any breeder flock or farm pattern.

3. Leg edema

   This problem is usually found at the processing plant and is characterized by hemorrhages and edema of the legs. The etiology of this syndrome is unclear but is thought to be caused by loading and hauling of turkeys for long distances.

C. Broiler Breeder hens

1. Viral arthritis

   This is a frequent problem in pullets and is frequently misdiagnosed as staph. VA causes a chronic culling problem especially in males on slats. Obtaining pullets from parenterally immune hens will minimize losses from VA in pullets.

2. Feed ingredients

   One of the major causes of sporadic production slumps is variation in feed ingredients. Adulteration of feed ingredients in tank cars is a common finding. Noxious weed seed and mold-damaged ingredients should also be considered when looking for the cause of production slumps.

Although incomplete, these are some of the common problems most of us see on a daily basis. The causes of these problems are unknown; however, continued research will result in finding the cause and cures of these problems.

HATCHERY MANAGEMENT

Willard McFayden

A slide presentation reviewed problem areas in egg, hatchery and brooder management that should be checked on by the Hatchery Manager.

It emphasized that the Hatchery Manager should improve communications with the breeder manager to the point of visitation. Some important items to check while visiting the farm--like flock health to include parasites; flock management as it pertains to the regularity of egg gathering; nest materials; condition of the house, feeders, waterers, and feed storage bins; temperature of egg storage and cleanliness of the egg room were mentioned.

Back at the hatchery, it was suggested that the Manager stress gentle handling of the egg each time that it was moved to minimize checks and cracks. By so doing, the percentage of hatchability was certain to improve. The many areas discussed in this regard were receiving eggs, storage, traying, setting, and transferring.

Hatchery sanitation was presented as a means of improving hatchability, reducing culls, morbidity, mortality, and means to reduce condemnations at the processing plant. Cleanliness of areas was stressed, especially in the egg holding and traying rooms, incubators, hatchers, and the bird servicing areas, especially in areas where cuts or injections were made.

The manager was asked to keep all visitors out of the hatchery. Visitors include people, cats, rats, dogs, cockroaches, flies, etc.

The need to segregate the various areas of the hatchery by doors, work flow, and air movement was stressed.

In closing, the Hatchery Manager was asked to coordinate the placement and cooperate with the growout manager so that quality control measures would extend to the placement of birds in clean, warm, and properly equipped facilities.

TURKEY MANAGEMENT

Joel Coleman

Management practices in turkey production differ from section to section across the country. The purpose of this discussion of management practices in the turkey production in the Eastern part of North Carolina is to give suggestions that might be adapted for your operation.

Housing Requirements

Basic House - 30 to 40 ft. wide and 300 to 400 ft. in length.

Insulation - 1/2 to 3/4" styrofoam in ceiling and end walls.

Curtain sidewalls - with natural ventilation.

House Preparation

Before poults are placed, houses are washed and disinfected with a high-pressure orchard sprayer which is mounted on the frame of a truck.

Bulk feed trucks are emptied completely of all feed and then washed out and disinfected. Each grower cleans and disinfects all equipment in his houses.

Litter

Shavings are furnished to the contract grower and all labor involved in spreading shavings and preparing the house for poult placement is furnished by the contract grower.

A built up litter program is used. All litter is removed from each house only once each year, or after three consecutive flocks have been raised in that house. New litter is added before each new flock of poults is placed. A disinfectant and insecticide is broadcast over the litter.

Arrangement of Brooding Equipment

Pancake-type brooders are winched from the center of the house. A brooder guard is placed in a 16-18 ft. circle around each brooder.

Four automatic bell-shaped plastic water drinkers are placed in each brooder ring. Six 36" x 4" metal feeders are placed in each ring. Also, one plastic one-gallon water jar is placed in each brooder ring.

Poult Placement

A maximum of 380 poults is placed per brooder ring. Each brooder house is equipped with a thermometer for monitoring room temperature. Also, each house is equipped with a high-low thermometer for recording changes in house temperatures. Poults are delivered to the farm before 10 a.m..

Debeaking

Poults are debeaked at 7 to 9 days of age. A debeaking crew of three confine the poults in one corner of the ring and use dog toenail cutters to cut the upper beak just in front of the nostrils. Poults remain in the brooder rings for one day after debeaking. Brooder guards are used to divide the house into four sections for 3 or 4 days after rings are removed. This prevents poults from bedding-down all in one end of the house or all in the center of the house.

Feed is added to automatic feeders when brooder rings are removed. Small metal feeders are removed gradually as poults learn to eat from the automatic feeders.

Finishing House

Heavy-type hens and toms are brooded at 1.25 sq. ft. per bird for 7 weeks then moved to a finishing house at 2.5 sq. ft. per bird for hens, and 3.5 sq. ft. per bird for toms. In most cases, finishing houses are on different grower's farms. One line of feeders and two lines of waterers are used per house.

Feeding Program

Birds are fed on a poundage basis instead of age basis. Feed is figured and ordered by computer. Servicemen or growers do not order feed.

Servicemen

Each serviceman is responsible for approximately 300,000 turkeys and approximately 20 different contract growers. A serviceman will visit twice each week each flock of turkeys that is less than 4 weeks of age, and once each week each flock that is more than 4 weeks of age. Birds are posted each week when the serviceman visits the flock. Birds are sample-weighed each 3 weeks and flock progress reports are kept on weight for age and feed conversion at time of weighing.

AN OUTLINE OF MANAGEMENT SUGGESTIONS FOR BROILER BREEDERS

Paul Souder

I. Feeding:

A. Full-feed chicks thru 21 days of age.

1. Between 14-21 days of age, weigh feed each day (this is to determine the amount of feed required for pullets to weigh 0.75 lbs. and cockerels to weigh 0.90 lbs. at this age). Use a good weighing device for the measurement of feed.

B. Limit chicks to 9-10 lbs. feed every day from 21-28 days of age.

1. Whenever chicks consume this amount of feed in 5 hrs., begin every-other-day feedings by doubling the 9-10 lbs. per day to 18-20 lbs. every other day. Continue every-other-day feedings until 22 weeks of age or until first few eggs.

2. Weigh chickens at 28 days of age. This provides a means of determining the amount of feed increase needed.

C. Increase amount of feed every week after 4 weeks of age, if possible.

1. As body weight requires, according to established body weight standards.

D. Cold weather feedings--

1. Delay beginning every-other-day feedings until 6 weeks of age in the months of December, January, February, and March.

2. Feed birds in the afternoon so that feed is consumed 2 hrs. before dark.

3. On extremely cold days, feed every day even after 6 weeks of age in the afternoon so that feed is consumed 2 hrs. before dark.

II. Water Restriction:

A. Begin water restriction when every-other-day feedings are begun.

B. On feed days--

1. Turn water on first.

2. Feed chicks.

3. Leave water on until 1 hr. after the feed is all consumed.

a. Exception with hot weather (temperature above 85^{o}F.); see following note: (II-D-3a).

C. On off-feed days--

1. Turn water on same time as on feed days.

2. Turn water off 2 hrs. later.

a. Exception with hot weather as mentioned above (II-B-3a).

D. Use of water restriction--

1. Means of keeping litter in good condition.

2. Begin when every-other-day feedings are begun until 22-23 weeks of age.

3. With extremely hot weather (temperature 85^{o}F.), birds will require some water in the afternoon to prevent dehydration.

a. When birds no longer drink and begin to play in the water, turn the water off.

III. Weighing birds:

A. Check body weight at 21 days of age.

1. Average standard, pullets should weigh 0.75 lbs.

2. Average standard, males should weigh 0.90 lbs.

B. Check body weight at 28 days of age (off-feed day).

1. Average standard, pullets should weigh 1.00 lbs.

2. Average standard, males should weigh 1.20 lbs.

C. Weigh birds on off-feed days after every-other-day feedings are begun.

D. Weigh birds every 2 weeks from 4-16 weeks of age.

E. Weigh birds every week from 16 weeks of age until the peak of production period.

F. Weigh birds monthly after the peak of production period.

IV. Lighting:

A. Initial lighting stimulation program -

1. January 15 hatch = 20 weeks June 4
   feed for body weight.

   February 15 hatch = 20 weeks July 4
   put on 1 hour before sunrise, off ½ hour after sunset.

   March 15 hatch = 19 weeks July 25
   on 1 hour before sunrise, off ½ hour after sunset.

   April 15 hatch = 19 weeks August 25
   on 1 hour before sunrise, off ½ hour after sunset.

   May 15 hatch = 19 weeks September 25
   on 1 hour before sunrise, off 1 hour after sunset.

   June 15 hatch = 19 weeks October 25
   on 2 hours before sunrise, off 1 hour after sunset.

   July 15 hatch = 19 weeks November 25
   on 2 hours before sunrise, off 2 hours after sunset.

   August 15 hatch = 19 weeks December 25
   on 2 hours before sunrise, off 2 hours after sunset.

   September 15 hatch = 20 weeks February 1
   on 1 hour before sunrise, off 1 hour after sunset.

   October, November, December hatch; feed for body weight and
   pullets will come in at 5.00 to 5.25 average.

2. Illustrated example:

Chicks hatched on February 10 will be 20 weeks of age on July 1. The sunrise in Jackson, Miss. is 4:57 a.m. and sunset 7:12 p.m. (CST) which is a total of 14 hours, 15 minutes from sunrise to sunset. Daylight appears 30 minutes before sunrise and darkness appears 30 minutes after sunset. This would be 4:27 a.m. until 7:42 p.m. for a total of 15 hours, 15 minutes of total daylight. You need to add at least 30 minutes to the 15 hours, 15 minutes for a total of 15 hours 45 minutes. This additional 30 minutes should be provided in the morning on July 1 for 20-21 week old pullets.

You may acquire a sunrise-sunset chart for your area by writing to: Nautical Almanac Office, U.S. Naval Observatory, Washington, D.C. 20390.

B. Additional lighting stimulation--

1. May be given in amounts of 30-60 minutes each time between 22-24 weeks of age and again 2 weeks prior to peak production.

Note: When constant lights are used on pullets 1-20 weeks of age, hatched in the fall of the year, use body weight standards suggested for February-July hatches. These birds will not mature with a light body weight as those using natural daylight this time of year.

V. Production preparation--Fall vs. Spring:

A. Explanation--

1. Pullets reaching 15 weeks of age after June 1 must be treated differently than pullets reaching 15 weeks of age from January 1 - June 1.

a. Lighting differences of nature--need for lighting program given previously for each month of the year.

b. Body weight of birds must begin to be heavier to aid in maturing these birds due to not receiving additional light from nature during the months of July 1-January 1 because of decreased day length.

B. Pullets hatched between February and July need to weigh approximately 5.75 lbs. to reach 5% production.

1. This is approximately ½ lb. heavier than pullets hatched between August and January.

a. This additional body weight increase needs to start at 16 weeks of age.

b. Production will reach 5% in the fall with bird weight being approximately 5.75 lbs.

c. Production will reach 5% in the spring with bird weight being approximately 5.25 lbs.

C. Avoid overweight birds from 3-15 weeks of age.

1. As defined by established weight standards.

D. Avoid underweight birds from 15-24 weeks of age.

1. As defined by established weight standards.

VI. Management summary:

A. Check feed intake at 14-21 days, weigh feed.

B. Check body weight at 21 days.

C. Weigh birds regularly every 2 weeks to 16 weeks, then every week to peak production. After peak, sample-weigh birds monthly.

D. Increase in feed: Use body weight as a guide and increase approximately 1 lb. per week.

E. Fill in all data each week on production graph. It is very important to keep it up to date.

F. Plot the following data on production graph:

1. Body weight.
2. Feed actually fed.
3. Percentage of production.
4. Percentage hatchability.
5. Number of hours of total lights used.

G. 5% production should occur at 25 weeks of age for good hatching egg size.

H. Body weight must never stop gaining after 15 weeks of age.

RELATIONSHIP OF INSULATION TO THE RESTRICTED FEEDING OF COMMERCIAL LAYERS

Roland Coles

We started keeping records in 1970 and it was found that birds in January and February were eating 28 lbs/100 birds and production had dropped at the end of the cycle.

History of Feed Restriction of Commercial layers:

A. We used a time limitation down to 4 to 6 hours per day with speeded-up feeders and count-down clocks on Augers along with calibration of Augers.

B. Time limitation worked like a charm for about 6 weeks - then culls started developing because all birds could not eat at one time.

C. We ended up with 6 good producers eating at a 24 lb. intake rate and 2 non-producers eating at a 16 lb. intake rate - averaging 22 lbs/100 birds.

It became apparent to us that there had to be a better approach. Based on widespread studies of the relationship of temperature to feed intake, we then began to use temperature as a major factor in feed intake control.

To remove extreme temperature control, primarily low extremes, we took three approaches: 1) Increase bird density - 2/3 to 1/3 square feet building space, 2) Avoid over-ventilation by maintaining a good environment with minimum dust, odors, and gases, 3) Increase insulation to avoid heat loss so that a high temperature can be maintained at minimum air movement but still maintaining air quality.

In houses where heat loss is high, feed intake may exceed 28 lbs/100 birds in winter months. During periods of extreme heat, feed intake may drop under 19 lbs/100 birds.

As a rule of thumb, temperature increases up to 80° with good air quality - each 1° rise in temperature lowers feed requirements by ½%.

Example: A flock eating 24 lbs at 60° would eat 22.8 lbs at 70° and 21.76 lbs at 80°. With temperatures exceeding 80°, average egg size and production will decline.

With good housing, we should strive for the highest possible average house temperature so long as we don't exceed 80° maximum daily average temperature. Again, I repeat, good air quality must not be sacrificed because bird performance will drop along with shell quality deterioration.

Here is an example of how much you can spend on extra insulation for a 50,000 bird house with good air quality, close management, and good air movement to prevent stratification and dead air pockets:

Using today's feed prices at 7¢/lb and maintaining average air temperatures at the range of 75 to 80° rather than the 65 to 75° range, you would save 5% of your feed (each 1° in air temperature lowers feed demand by ½%) with birds eating 24 lbs for 6 months of cold weather.

```
24 lbs X 5% =            1.2 lbs/100 birds/day
                          x 500
                          600 lbs/day
                          x 7
                      $  42.00 /day
                        x182.5 /days
                      $7665.00
```

Using a 10-year depreciation schedule you could spend $76,650 or $1.53/bird. Using a 15-year schedule you could spend $114,975.

The cost of doubling insulation for a 50,000 bird house would cost $6,000 to $10,000 depending on materials used - 8R side walls and 12-14R ceiling to 16R side walls and 24-28R ceiling. This does not take into account any adjustment for benefits during hot weather where you can realize a 2% better rate of lay, a 3% better egg size and better shell quality which could amount to 20 to 25¢/bird per year. Remember, if you only realize one-half of the summertime advantages of 10 to 12¢/bird per year, you could afford to spend $50,000 on a 50,000 bird house on a 10-year depreciation schedule.

To summarize what I have said about the relationship of insulation to the restricted feeding of commercial layers: 1) We think a bird could be restricted by 10% on feed intake if we had the facilities that it takes - mainly the reverse cages where all birds eat at one time which means we could restrict a 24 lbs. intake bird to possibly 21.6, 2) Since this is not feasible, we turn to temperature as a restricting influence and raise temperature 10^{0}, thereby lowering feed demand by 5% or 22.8 lbs. and then go with a 4 to 5% reduction, realizing our goal of 21.76 lbs. without loss of production or egg size and probably obtaining an increase in production performance over 24 lb. intake level.

AVIAN MYCOPLASMA INFECTIONS

S. H. Kleven

Of the numerous avian mycoplasma serotypes known, three have been shown to be pathogenic. *Mycoplasma gallisepticum* (MG) and *M. synoviae* (MS) infect chickens and turkeys, and *M. meleagridis* (MM) infects turkeys (9).

MG is well known for its ability to produce airsacculitis, especially when present in conjunction with respiratory virus infections or *E. coli* (9). However, with the success of eradication and control programs, clinical MG infections are only occasionally observed in the U.S. (3, 10).

At the present time, more serious problems with MG are the occasional difficulties experienced with serologic testing programs in breeder flocks. One of these is the problem of nonspecific agglutination reactions. Several explanations and solutions for nonspecific agglutination reactions have been proposed, and have been recently reviewed (2).

Another factor causing difficulties in serologic testing programs has been infection with relatively "avirulent" strains of MG in flocks 30 weeks of age or older (3, 10). Typically, several weeks or months may elapse before a high proportion of agglutination reactions can be detected - the flock may never have over 40-60% reactors on the serum plate agglutination test.

Hemagglutination-inhibition (HI) titers develop very slowly and titers of 1:80 to 1:160 are rare and present in only a few birds. Although isolation of MG is difficult, the organism can usually be isolated from the tracheas of a small percentage of the birds. There are seldom any clinical signs observed, and confirmation of the diagnosis may take weeks to months.

Recent experiences indicate that subtle antigenic variations similar to those reported by Roberts (7) may complicate the serological diagnosis of MG. Table 1 gives agglutination and HI reactions after artificial infection with an MG isolate designated as strain 730. This strain was isolated from a breeder flock with a low rate of agglutination reactions and negative to low HI titers. Sera were tested using antigens prepared from homologous (730) and standard (A5969) MG strains as well as another isolate (503). Agglutination reactions were detected earlier with the homologous antigen, but all antigens reacted well after 21 days post infection. HI titers were always higher with the homologous antigen, except at 21 days post exposure.

Tables 2 and 3 give agglutination and HI reactions in leghorn breeder flocks naturally infected with a mild MG strain which appears to be closely related to the 730 strain described above. In all cases, the 730 agglutination antigen detected a higher percentage of infected birds than the standard (A5969) antigen. Even though HI titers were often low with both antigens, the 730 antigen always gave higher HI titers. The MG isolation rate from tracheal swabs varied from 0 to 10%.

These data would suggest that there may be some advantage to preparing homologous antigens to be used only within certain closely related breeding flocks or poultry complexes. Of course, isolation of the organism would be ideal, but this is usually difficult and time consuming.

M. synoviae is recognized as the etiologic agent of infectious synovitis (6). More recently, it has been shown to be an important cause of airsacculitis in broiler chickens (1, 5, 8); this syndrome is now more commonly observed than synovitis. More recent isolates of MS have a higher potential for inducing respiratory lesions than earlier isolates, which are more apt to produce synovitis (4). MS is currently a leading cause of condemnations due to airsacculitis in major broiler producing areas of the U.S., especially during the winter months. Typically, affected broilers are progeny of a breeder flock which has recently become infected.

Mycoplasma meleagridis continues to be present in practically all of the commercial turkey flocks of the U.S. It is recognized as the major etiologic agent of airsacculitis in young turkey poults (12), and more recently as a major cause of stunting, poor feathering, and bone deformities (11). Dipping of hatching eggs in antibiotic solutions is widely practiced in commercial turkey growing operations. This procedure reduces the level of infection and the severity of the disease, but does not completely eliminate egg transmission.

Efforts are being made to produce MM-free primary breeding flocks. Combinations of egg dipping and antibiotic treatment of poults (6) as well as antibiotic inoculation of hatching eggs (7), are being evaluated. Both procedures show promise, but at the present time there is no commercially available source of MM-free turkeys.

Table 1. Agglutination and HI Reactions after Experimental Infection with the 730 Isolate of *M. gallisepticum*.

Days Post Infection	Agglutination Antigen			HI Antigen		
	A5969	503	730	A5969	503	730
0	0/10[A]	0/10	0/10	0[B]	0	0
7	1/10	8/10	10/10	0	0	0
11	2/9	7/9	9/9	0	0	0
14	2/8	6/8	ND[C]	0	0	0
21	6/8	7/8	8/8	5.9	2.1	0
28	7/8	8/8	8/8	7.0	5.0	14.6
35	7/8	8/8	8/8	11.3	3.1	24.5
42	7/8	7/8	8/8	3.8	6.5	13.4
49	8/8	8/8	8/8	ND	6.5	25.2
56	7/8	6/8	8/8	8.0	14.6	29.2
63	8/8	6/8	8/8	4.5	9.5	47.6

[A] No. Positive/No. tested

[B] Geometric mean titer

[C] Not determined

Table 2. Agglutination and HI Reactions to M. gallisepticum using Standard (A5969) and Homologous (730) Antigens and Tracheal Isolations of MG in a Naturally Infected Leghorn Flock.

Age (weeks)	Agglutination Antigen		HI Antigen		MG Isolations
	A5969	730	A5969	730	
23	35/99[A]	99/99	56.6[B]	74.1	9/99
27	35/77	73/77	7.7	16.4	7/81
28	7/38	37/38	0	1.3	3/40
29	9/38	37/38	1.2	2.1	4/38
30	7/38	37/38	1.3	2.2	3/38
31	18/38	37/38	2.5	3.0	2/38
32	14/38	38/38	0	1.3	0/38

[A] No. positive/No. tested

[B] Geometric mean titer

Table 3. Agglutination and HI Reactions to *M. gallisepticum* using Standard (A5969) and Homologous (730) Antigens and Tracheal Isolations of MG in a Naturally Infected Leghorn Flock.

Age (weeks)	Agglutination Antigen		HI Antigen		MG Isolations
	A5969	730	A5969	730	
52	18/100[A]	100/100	1.6[B]	25.0	0/100
57	11/100	92/100	1.5	1.8	5/100

[A] No. positive/No. tested

[B] Geometric mean titer

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DIAGNOSIS OF DISEASES INVOLVING THE BURSA OF FABRICIUS

R. K. Page

The bursa of Fabricius is an aggregation of lymphatic tissue located dorsal to the cloaca in young chickens. This organ functions in the young chicken as a site for the maturation and dissemination of cells involved in humoral antibody production. The bursa begins involution in birds 6-8 weeks of age and has virtually disappeared in sexually mature chickens. A wide variety of viral, bacterial, and toxic materials can result in alteration of bursal function when given at the right time.

The normal histological appearance of the bursa is that of a cluster of grapes, each segment filled with immature cells. At maturation these cells are forced out into the circulatory system and can be found in a wide variety of lymphoid tissues. A number of viral diseases, the most recognized of which is Gumboro, can result in bursal lesions. Gumboro virus in birds not carrying parenteral immunity can cause severe necrosis of the lymphoid tissue of the bursa resulting in a bird which in immunologically incapable of developing good antibody response to a variety of antigenic stimuli. Marek's disease virus can cause an intrafollicular proliferation of fibrous tissue altering the normal architecture of the bursa and altering the normal bursal function. Lymphoid leukosis virus frequently results in neoplastic transformation of the bursa and tumor development in the bursal follicles. Many of these tumors will cause almost complete destruction of bursal function. I am sure a wide variety of other viral infections can cause alterations of bursal function if the birds are exposed to them early in life.

Cryptosporidia is a parasite we have found in several chickens with clinical lesions of Gumboro. Little is known about this organism in the avian species; however, it has been shown to be the cause of diarrhea in monkeys. The importance of this organism remains to be ascertained.

A wide variety of toxic elements also will result in bursal lesions. Aflatoxin and ochratoxin are two examples of mycotoxins which will result in bursal lesions. Aflatoxin has been shown to decrease the immune capabilities of turkeys and there is good reason to suspect a similar problem exists in chickens.

The bursa is a site of rapid cell division and maturation. Any number of bacterial, viral, and toxic materials can alter the normal immunological function of the bursa if they are present during this period of rapid cell division.

PROPER USAGE OF ANIMAL HEALTH PRODUCTS

Presented by: John Farnham

Written by: Robert N. Bailey

I am very happy to be here today in my role as consultant to the Animal Health Institute. The AHI is a national trade association, much like yours, representing manufacturers of animal health and nutrition products.

I am not here today to preach to you or take you to task, or indeed, to tell you that we have a problem regarding the proper use of animal drugs and medicated feeds. You are well aware that we have a drug usage problem. And I won't waste your time and mine preaching to the converted. It is a problem that has been with us for years, is still with us, and one that we will probably have to face from now on.

I am going to talk, though, about an off-shoot of this issue which is at least as troublesome to us as the so-called problem of proper drug usage --- which is the <u>public perception</u> of the supposed hazards to our food supply arising from the use of agricultural chemicals and animal drugs in food production. Then I want to talk a little about what we ought to be doing about it. Since giving some thought to this presentation, I have given particular attention to recent presentations by the various news media on the subject of chemicals and animal drugs in the food supply. Some recent examples ....

The popular science program, "Nova," produced by the Public Broadcasting System, had an hour program a few weeks ago on the misuse of antibiotics through over-prescribing by physicians; over-the-counter availability of these drugs in many countries; and use in food-producing animals. The work of British scientist

Anderson and the original Japanese studies regarding the genetic transfer of antibiotic resistance was described at length; the action taken in England as a result of the Swann Committee Report was reported. In fact, it was stated that no antibiotics would be effective in the treatment of human diseases within ten years because of the flagrant misuse of these drugs. Not one contrary opinion, or references to contrary findings, were presented. There have been several recent reports of the withdrawal of dried milk powder - penicillin residues.

The unfortunate and tragic error which occurred three years ago with the substitution of the fire retardant compound PBB for another ingredient in animal feeds in Michigan is still producing sensation in the press and TV arising from coverage of Senator Kennedy's hearings.

Farmers Convinced Something Wrong

Schmidt Defensive ... No Scientific Evidence of Problem

Kennedy Indignant

Media events leading to the regulatory action of DES, and more recently on the nitrofurans are fresh enough in our minds to give appreciation to my thesis that the public perception of our industries is somewhat negative ... especially as we may be affecting the wholesomeness of the food supply. Everyone today, it would seem, is taking a much greater interest in everything we do ... consumer groups, environmentalists, the news media, government agencies, and certainly the Congress are watching and taking actions which affect our products and our businesses. With this climate as a background we also now have available ever more sensitive detection techniques which are finding drug and chemical residues in amounts as small as to be reported in parts per billion or parts per trillion. Without attempting to defend the probable harmlessness of most of these residues, the fact is that they can be detected, and are illegal, according to current laws and regulations.

What is the actual situation with respect to illegal residues in the nation's food supply? Almost all of the meat, poultry, and dairy products sold in the United States is free of illegal residues resulting from improper use of animal drugs and medicated feeds, as determined by the government's monitoring programs. Even the small amounts of illegal residues found, however, have resulted in the condemnation of some 17 million pounds of animal source food in the U. S. last year; a staggering total, given today's world-wide food shortage.

Would you be interested in some of the details of these illegal tissue residues? The FDA reports that in 1975 failure to follow pre-slaughter withdrawal times for animal drugs accounted for 72 percent of the violations. Other violations resulted from the following:

Suspected feed mixing or feed delivery error ... 15%

Inadequate storage bin cleaning ... 8%

Failure to state withdrawal times on the drug labels or feed tags ... 5%

The FDA also found that 53 percent of the residue violations could be traced to the use of medicated feeds; 36 percent to injectable drugs; 10 percent to capsules, boluses, and other forms of direct oral administration; and one percent to medication given in drinking water.

The FDA study shows several significant changes in the causes of residue violations between 1974 and 1975. Medicated feeds are the leading cause of violative residues in 1975 as compared to injectable drugs in the previous year.

So, even though the problem is not quantitatively large, it is none the less a problem ... made larger by the climate of unfavorable public perception referred to before. Now is the time for the whole industry ... all along the chain from the manufacturer to the end use of animal drug products, to take positive action in the matter of good drug usage practices. Any program which has for its objective insuring proper drug usage through education, training, or increased awareness will, I believe, be seen as a positive factor ... even by our most severe critics. Along with this, I believe that positive efforts must be made to correctly inform the public regarding the wholesomeness of their food supply, and of the efforts being made by all members of the food production team to insure that this is maintained.

What are some of the positive actions now being taken or being planned?

The Bureau of Veterinary Medicine's Industry Relations Branch of the FDA has been promoting the proper use of animal drugs among animal drug users and related audiences for nearly three years.

In early 1973, the first "Withdrawal" Memos were issued by animal species, showing the pre-slaughter withdrawal times of commonly used drugs. In 1975, these were improved and issued as "Animal Drug Use Guides." Several hundred thousand copies have been distributed to various users -- educators, regulators, drug firms, feed mills, etc. as a guide to proper use. Last spring, all 8,500 vocational-agriculture departments in the U.S. received a set of the guides as did the state Extension Veterinary Newsletters, and distributed in many other ways.

To reinforce the printed program, the branch began a four-times-per-year public service radio spot campaign in 1974. In January, it is estimated that some 2,400 recipient radio stations gave $1.5 million in free air time to this program and reached millions of rural listeners. Projection of value for all of 1976 (issuance of four sets of spots) is conservatively estimated at $3.7 million, based on a survey of returned reply cards.

Currently underway are efforts to place public service announcements in the print media reaching rural audiences. This program is in the embryo stage and will pick up momentum as the year progresses.

The bureau's basic approach to promoting proper drug use is to encourage livestock and poultry producers to read the label and follow its directions -- including observance of the withdrawal period sufficiently ahead of slaughter. It's a simple message, but it bears repeating time after time -- not only by the bureau -- but by every component in the animal drug marketing chain, from maker to user.

One of the more interesting programs now in the planning stage is a quality control assurance residue program now being considered by the National Broiler Council in collaboration with the USDA. The main goals of such a program would be to develop a system to be used by industry of individual producers to control residues in broilers, reduce federal monitoring, and maintain 100% consumer protection.

Participating companies would assume complete responsibility for conducting this quality assurance program. For example, the companies would be asked to submit approximately six birds from a specific flock for testing of specified compound groupings about 10 days prior to slaughter ... using approved laboratories. The USDA would monitor the effectiveness of the program based upon individual management systems. Broilermen would have to weigh the costs against the marketing advantages which would accrue from being able to make positive quality assurance statements about their product.

The AHI has a number of programs of positive action. Some of the AHI efforts include:

AHI'S clock symbol for cautioning the product user to follow label directions

The institute's double-arrow warning/withdrawal symbol for alerting the user to warning/withdrawal information on those products which require such information.

These symbols appear on product labeling, in advertising, and on feed tags in some cases.

AHI has also had for several years a 35mm slide kit, "Animal Drugs: Their Use and You" which promotes proper drug usage. The kit is available for $15 from the institute, or may be borrowed. In the near future, the information on the slides will also be available as a film strip. Suitable uses for this material include: sales presentation or training sessions for salesmen, producer meetings, Extension presentations, Vo-Ag classes, and meetings of FFA or 4-H.

In 1974, AHI began a series of lectures to all U.S. veterinary schools on the development of animal drugs and their proper use. This program is continuing in its second round of visits to these schools.

AHI has also begun several new programs as part of a major expansion of its proper drug usage educational program which the institute's board of directors is actively encouraging. These include:

Development of a program of public service messages for TV stations in farm areas and the agricultural trade press.

Sponsorship of my own program of visits to groups such as yours to discuss the proper drug usage situation and to search for cooperative ventures.

AHI also began last year an extensive educational program, directed at key consumer reporters and broadcasters in the nation's news media, which explains the role which animal health products play in bringing wholesome meat, poultry, and dairy products to American tables. Background materials have been and are being sent to 1,500 news media representatives. Moreover, this year the institute will have a touring home economist in key cities who will appear on TV and radio talk shows and before other consumer groups to speak on meat producers and animal health products.

A consumer oriented leaflet, "The Meat Story" is now being printed which is based on the institute's slide presentation of the same title.

In order to be in a position to counter the widespread misinformation on food residue and safety problems, -- as well as to resolve questions posed by the FDA and other agencies -- the institute is currently sponsoring 23 research studies. Fifteen of these relate to the subtherapeutic uses of antibacterials in animal feeds. Others involve sulfonamides, neomycin, dihydrostreptomycin, and diethylstilbestrol.

In addition to the programs listed above, many of our own member companies have developed their own programs which have as their objectives the promotion of proper drug usage, education of product users, and the development of consumer confidence in the safety and wholesomeness of meat and dairy products.

We must self-regulate and self-impose good drug use practices or we will inevitably face imposed repressive regulations, and a limitation on the availability of those products which make economic animal production feasible. Furthermore, we face the risk of worsening consumer understanding and support while providing grist to the mills of those of the consumer advocates whose motives are self-serving and politically oriented.

If we in agriculture do not keep our own house in order, the deadening hand of bureaucracy will impose unnecessary restrictive regulations -- and we will have provided them the tools to work with.

Our industry will be increasing its efforts toward assuring that animal drugs are used properly, and that their necessary role is understood by the consumer. We sincerely hope that you will join us in this vital effort.

INSULATION REPORT

Harold Waite

The following table gives the results obtained from the portable testing equipment. Testing was done by Dow Chemical U.S.A. and other personnel in Room 166 on September 15 and 16, 1976 at the Sheraton Inn in Salem, Virginia. The following gentlemen contributed samples for testing: Lowell Sharpes, Doug Ogden, Alvin Roadcap, Randy Moyer, Richard Eaton, Stan riggins, Frank Bontz, Pete Secrist, Clyde Bryant and Dick Boyd. The following is a summary of the results:

	Age in Years	Published R-Value	Tested R-Value
Skinned Polystyrene Bd. 1"	3-1/2 to 4	5.0	5.0 to 5.4
Skinned Polystyrene Bd. 1½"	2-1/2	7.5	7.5 to 7.8
Fibrous Glass Batts, 3" (original 3")	9-1/2	11.13	7.7
Fibrous Glass Batts, 2" (original 3")	9-1/2	11.13	5.6
Mineral Wool Batts, 2" (original 3½")	7 to 11	11	5.4 to 7.2
Mineral Wool Fill, 2½"	12	8	5.3
Wood-Paper Fill, 2½"	New	8	5.0
Urethane-faced Bd. 5/8"	1	5	3.5 to 3.8
Urethane-faced Bd., 1"	6 to 7	9 to 7	5 to 5.4
Beadboard, 1-1/2"	New	6.5	5.0
Dev. urea formaldehyde, 1"	New	5.0	2.3 to 2.9

All those gentlemen contributing samples will receive specific test results of each sample tested.

Thank you for letting us test the "Real Insulation Value" of insulations from your facilities.