



Alternative Poultry Production

by Nathaniel L. Tablante

Ever since the wild jungle fowl was domesticated by man, poultry production has been transformed from a small family/home consumption operation to an intensive, vertically integrated commercial enterprise that utilizes a combination of nutrition, genetics, management, and disease prevention strategies in response to the increased demand for affordable, safe, and nutritious poultry products. However, some consumers prefer the traditional home-grown or “free range/organic” chicken or egg because they believe that these products are more “natural” than their commercially raised counterparts that are raised in confinement and given medicated feed. Some farmers recognize the market

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potential for poultry products raised in their “natural” environments. These so-called “alternative poultry production” systems definitely have niche markets but they are not without their inherent risks. One of our guest writers, Dr. Mike Darre, Extension Poultry Specialist from the University of Connecticut, discusses the disease risks involved with raising free-range poultry.

The use of some “growth promotants” or performance enhancers (which are usually low levels of antibiotics added to poultry feed to prevent enteric disease and stabilize the gut microflora) in commercial

poultry has been questioned by some consumer advocates and human health researchers, as well as by the Food and Drug Administration-Center for Veterinary Medicine because of the apparent development of strains of bacteria that are resistant to the human counterpart of some commonly used poultry antibiotics. Poultry companies claim that the use of low levels of antibiotics in poultry feed helps prevent necrotic enteritis and hastens the absorption of essential nutrients, resulting in faster growth and improved weight gain. However, they also recognize consumer and government concerns about antibiotic resistance and some companies have already started growing antibiotic-free broil-

ers, albeit on a small scale or pilot level. Jeff Wilson, a Broiler Manager from Townsends, Inc., shares his company’s experience with raising antibiotic-free poultry. There is obviously no secret formula for success, but Wilson’s article provides a lot of practical information for those interested in raising antibiotic-free broiler chickens on a commercial scale.

As the guest editor for this issue of Poultry Perspectives and on behalf of our regular editors, Drs. Inma Estevez and Roselina Angel, I would like to thank Dr. Darre and Mr. Wilson for sharing their precious time and expertise with us.

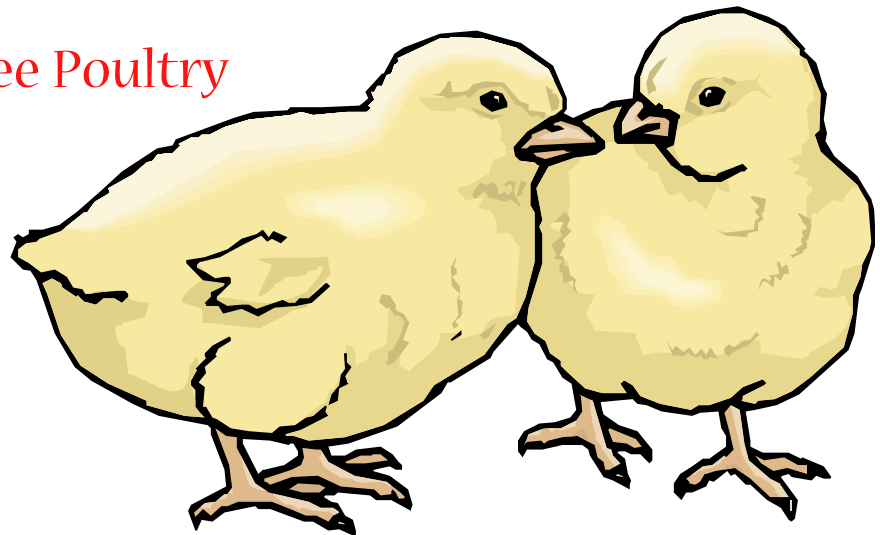


Comments from the Industry

Raising Antibiotic-free Poultry

by Jeff Wilson

As within any industry, technological advances are moving at a rapid pace, even in the area of broiler-meat production. If we consider the vast changes in broiler genetics research over the past few years, it is evident that the programs producers use have had to change many times. In addition to these changes, the poultry industry’s use of low-level feed additive antibiotics and therapeutic antibiotics, etc., is being scrutinized. When discussing the use of antibiotics in disease management of poultry, one must bear in mind the reasoning behind the use of antibiotics in the industry. Because of today’s regulatory environment and pressures placed on poultry companies by consumer groups and customers, we are at a point where not only do we need to continually strive to justify antibiotic use and needs, we must make preparations to explore and use alternative means to minimize



or possibly eliminate the use of so-called growth promotants or products used to enhance performance.

The Price of Going Antibiotic-free

Several factors will contribute to the successful production of an antibiotic-free broiler, but this will not occur without a price. First, it must be accepted that production costs will escalate for several reasons, and some of the most prevalent reasons will be discussed in this

article. Essentially, we can assume producers will start with the same day-old chick as if raising a standard commercial broiler, with the exception that no antibiotic is used in the Marek’s vaccination for a 100 percent antibiotic-free broiler. Once the bird is delivered to the farm, the differences must be implemented.

The pounds of meat produced each flock are going to be heavily impacted with a drug-free program. The population density of birds has a vital role in the ability to manage the health of a flock grown without antibiotics/drugs. A lower density

is important in alleviating stress on the birds by giving less competition for feeding and watering space. The decreased competition allows for less scratching, thus lowering the incidence of inflammatory process and allowing for overall better housing environment. Unfortunately, fewer birds placed per square foot does give an end result of fewer pounds produced per square foot. For example, in a typical commercial flock placement of a 21,000-ft²-broiler house, average density would be approximately 0.92 ft² per bird. For antibiotic/drug-free flocks, it may take an average density of 1.5 ft² per bird. This density results in approximately 40 percent fewer pounds produced if the same average weight were achieved as in the standard commercial flock. However, a lower rate of gain should be expected and will create a significant difference in the average weight of the flock in comparison to commercial flocks. Producers must be realistic and willing to accept a lower rate of gain. The results from the lower density and the decreased rate of gain will raise production cost per pound considerably for the poultry company due to overhead and fixed costs being the same regardless of pounds of meat per growing cycle. The poultry company would also have to compensate the producer for the lost pounds.

In addition to removing antibiotics, if one follows a program that does not allow for the use of any anticoccidials, then a vaccination program must be utilized to control the coccidia to which birds are exposed. As does any vaccination, coccidiosis vaccine creates a stress on the birds. In addition, managing a coccidiosis-vaccinated flock involves keeping the litter in the houses as dry as possible. A good deep litter base of 4 - 6" is necessary to aid in maintaining dry floors. Close monitoring of the flock is essential especially during the period of peak vaccine reaction and just following reaction. Even with the best conditions, a coccidiosis vaccination



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program will lead to poor feed conversion and decreased weight gain. The ability to control enteritis will become increasingly more difficult and challenging with antibiotic-free flocks. The use of a coccidiosis vaccination program is not as effective as anticoccidial feed additives in eliminating coccidial infection. These infections are often asymptomatic or sub-clinical and although they don't directly affect the birds, they predis-

pose them to more serious diseases such as Clostridial enteritis. Without low-level feed additive antibiotics to prevent Clostridial disease from progressing, preventing Clostridial enteritis becomes a distinct challenge.

There are other sacrifices that must be made if one is to raise poultry without the aid of antibiotics. The use of low-level feed grade antibiotics over the years has been a consistent tool used by the industry to enhance production. Growth-promoting antibiotics are associated with increased carcass weights during processing, increased breast yield, and reduced fecal contamination. It becomes necessary to focus on modifying other aspects of management to compensate for these potential decreases in production.

Maintaining Feed Quality

The role of formulation and nutrition is extremely important in managing antibiotic-free flocks. With the absence of the low-level feed additive antibiotics, ingredient quality will play an important

role in maintaining intestinal health and integrity. There has been much discussion in the poultry industry concerning what types of grains can be utilized in certain classes of antibiotic-free birds. The best advice I can give is, as with any flock, nutrition and ingredient quality should be high on your list of priorities.

Managing Sick Birds

Problems may be encountered with the inability to administer therapeutic treatment to flocks when the need arises. The majority of therapeutic antibiotic use in poultry is for the treatment of airsacculitis due to secondary respiratory infections caused by *E. coli*. Allowing sick birds in a flock to suffer and die in order to keep them in the program is not acceptable and treatment and subsequent rejection from the production program is appropriate. However, instead of creating a situation where birds must be treated, an emphasis should be placed on disease prevention. Vaccination technology has provided a viable means of effective control for poultry disease in the past, and we should continue to be steadfast in utilizing an effective vaccination program to prevent primary disease.

Preventing Disease

There have always been varying opinions within the industry in regard to down time, or the amount of time the poultry house remains dormant between flocks, but we felt it was critical in helping control many poultry diseases. I am confident in ranking down time as one of the most important management tools we have for positively influencing flock health. It is important to provide enough down time to decontaminate the house while not waiting so long as to delay continued production and impact the bottom line. Cleaning and disinfecting (C&D) between flocks helps break disease cycles; however, C&D is difficult to perform each time



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a flock is raised due to seasonal challenges during the winter. Also, cleaning, disinfecting, and replacing the litter with fresh shavings can be a considerable financial investment. When litter is removed from a house, it must have a destination. Most states have specific guidelines that must be adhered to in regard to litter storage and application. Alternatives may include the use of litter treatment for acidification, a process in which a chemical is added to the litter, dropping the pH to a level where bacteria cannot live. Unfortunately, some antibiotic-free regulations do not allow for these methods. In addition to controlling bacterial pathogens between flocks, vectors such as rodents and insects that are known to harbor and transmit poultry viruses and bacteria must be kept under control. Darkling

beetle control, which is a continual battle in commercial broiler housing, is of significant importance.

Maintaining a Healthy Environment

Environmental management has a significant impact on any flock's performance. Maintaining the proper temperature and ventilation for humidity and ammonia control are key factors in flock performance and flock health, especially in wintertime when producers only ventilate for the birds' minimum ventilation requirements. With any flock producers strive for optimum environmental conditions, but this is especially important for antibiotic-free flocks. Proper litter moisture is directly controlled by proper ventilation. Dry litter limits the population of bacteria and will control coccidia oocyst sporulation. Ammonia control helps minimize the effect of viral respiratory infections, aids in preventing secondary bacterial infections, and is critical to poultry welfare.

Biosecurity

One final topic that cannot be omitted is biosecurity. The poultry industry must be diligent in efforts to prevent the introduc-

tion and spread of disease within and between farms. Maintaining good biosecurity practices will be of absolute benefit to all flocks, not just antibiotic-free. In general, the poultry industry tends to only become concerned with biosecurity measures when reportable diseases are diagnosed within the surrounding area. This thought process must be abandoned, especially in light of the past year's battle with Avian Influenza and the current situation the U.S. is facing with Exotic Newcastle Disease. From a logistical perspective, increasing biosecurity can be difficult and expensive. Often the price tag for biosecurity measures may seem hard to justify and the cost effectiveness of such procedures may be hard to determine. Even so, ongoing biosecurity programs that prevent the introduc-

tion and spread of disease must play a significant role in the future of all production.

Is Antibiotic-free Production the Future?

The future of the poultry industry without growth-promoting antibiotics will likely be an area that each producer will have to explore to remain in broiler-meat production. Producers also may have to learn to manage flocks with fewer choices for therapeutic treatment or learn to use alternative means. The poultry industry may need to prepare itself to lose the other benefits of the growth-promotion antibiotics (increased carcass weights, maintaining intestinal integrity, improved processed carcass weights, increased breast yield, etc.).

Many topics have been mentioned in this paper and only brief comments made in regard to each. There is no magic recipe that can be written and followed to guarantee positive results in raising antibiotic-free poultry. Even though similarities and common challenges will always be present, there are too many variables and combinations of programs to allow for one standard procedure to be followed. Much will have to be left up to trial and error. Most likely a combination of many of the procedures addressed here, and some not mentioned, will have to be incorporated for each individual antibiotic-free broiler program to succeed. As in any endeavor, no single item is the ultimate key to success.



Disease Risks Associated with Raising Free-range Poultry

by Michael J. Darre, Ph.D., P.A.S.

New National Organic Standards

Poultry rearing and management appears to have come full-circle—from rearing poultry outside as a sideline supplement to farm income to total confinement for commercial layers and broilers back to range-rearing for layers and meat birds. (See Table 1.) Much of the current drive for free-ranged, range-reared, or pastured poultry has come from a small sector of consumers with a desire for “natural” or “organic” food products. They provided some of the impetus for the new National Organic Standards, a 500+ page document covering production and marketing of all organic products for human consumption. For example, the section for Livestock standards states:

“These standards apply to animals used for meat, milk, eggs, and other animal products represented



as organically produced. The livestock standards say that: Animals for slaughter must be raised under organic management from the last third of gestation, or no later than the second day of life for poultry. Producers are required to feed livestock agricultural feed products that are 100 percent organic, but may also provide allowed vitamin and mineral supplements. Producers may convert an entire, distinct dairy herd to organic production by providing 80 percent organically produced feed for 9 months, followed by 3 months of 100 percent organically produced feed. Organically raised animals may not be given hormones to promote growth, or antibiotics for any reason. Preventive management practices, including the use of vaccines, will be used to keep animals healthy. Producers are prohibited from withholding treatment from a sick or injured animal; however, animals treated with a prohibited medication may not be sold as organic. *All organically raised animals must have access to the outdoors, including access to pasture for ruminants. They may be temporarily confined only for reasons of health, safety, the animal's stage of production, or to protect soil or water quality.*" (Italics added for emphasis.)

With the provision in the standard for access to the outdoors, there are many producers of organic eggs or poultry meat that will be forced to change their management practices. Some producers may not be able to produce year-round, because range rearing of poultry can be greatly affected by seasonal differences in temperate climates. For example, low winter temperatures and snow cover may preclude the rearing of poultry in the winter.

Environmental Control

Although range rearing of poultry can be quite successful, one of the major problems with free-range or outside reared birds is the lack of environmental control. Most mod-



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ern strains of chickens have been bred for confinement conditions and require precise environmental control to achieve maximum performance. Lighting, temperature, airflow, and manure management are major environmental components that affect bird health and are controlled in modern confinement housing. Under range conditions, however, the birds are at the mercy of nature. Although range housing or shelters are provided, they do not provide the same protection from the environment as confinement rearing.

Pest Control

Another factor important in health management is pest or wild animal control. This becomes difficult at best and almost impossible under some range conditions. Insects, rodents, wild birds, cats, and other animals can all be vectors in the transmission of disease to poultry. Wild birds may carry endo- or ectoparasites that can create health problems in and of themselves in addition to harboring other diseases.

It is a well-known fact that wild waterfowl can be carriers of Avian Influenza (AI), and for this reason most of the turkeys in Minnesota were moved from range or outside rearing to confinement facilities. Rodents and flies have also been implicated as carriers of AI. They pick up manure on their feet and bodies and move it from place to place. In addition to flies, other ectoparasites, such as mites, lice, ticks, fleas, beetles, cockroaches, and the lesser mealworm or litter beetle are disease vectors. In fact, the litter beetle is a common carrier of virtually all poultry diseases.

In addition to the bacterial, viral, or mycoplasma organisms that may

be transmitted from wild birds, insects, rodents, and other animals, ectoparasites such as lice and mites are more prevalent in birds reared outside. Scaly leg mites are often seen in backyard flocks, along with feather mites, northern fowl mites, and lice. These are not normally seen under good confinement management systems.

Internal parasites, such as coccidia (*Eimeria sp.*), large round worms (*Ascaridia galli*), hair worms (*Capillaria*), gape worms (*Syngamus trachea*), cecal worms (*Heterakis gallinae*), and many others are more commonly found in outdoor- and floor-reared birds than in cage confinement systems. Although all are treatable, they represent an increased expense and management effort required with outside poultry rearing.

Pasture-reared poultry may also be exposed to noxious weeds or other plant and environmental toxins not found in confinement houses.

Soilborne diseases, such as *Clostridium* and *Salmonella*, must also be controlled. Clostridial bacteria have the ability to “build up” if the area is not kept hygienically. Diseases caused by *Clostridia* bacteria include gangrenous dermatitis, necrotic enteritis, and botulism. They may also be found in association with many other diseases

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as “secondaries,” for example, in yolk-sac infections. Manure in soil and litter can also be a source of disease-causing organisms such as *Salmonella*, coccidia, and assorted worms.

Some of the common diseases of poultry may go unnoticed under certain range conditions, such as *Coryza*, *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, Laryngotracheitis, and Infectious Bronchitis. Range- and outdoor-reared birds need close inspection daily for symptoms and signs of disease, injury, and lameness.

Predation is also a major problem in range-reared flocks. In the northeastern United States, there are

many possible chicken predators such as raccoons, mink, fox, woodchucks, coyotes, wild dogs, weasels, eagles, hawks, and owls. Predators pose not only a risk of killing and injuring your birds, but also of causing major stress and fear in the birds, which may lower their overall immunity. These predators may also harbor disease.

Health Management Practices

Overall, growing birds is a risky business, inside or out. Current management practices evolved over many years of experience and research to what we have today. To feed the world with poultry products takes large, environmentally controlled facilities. This does not mean that the specialty and niche markets need to be overlooked. It just means that poultry producers using alternatives to commercial poultry management practices need to be just as careful, if not more so, as those using modern commercial management techniques. Outside- or pasture- or range-reared poultry can be reared in a healthy and economically viable manner if proper health management practices are followed.



Table 1. Percentage distribution of laying fowl by systems of management.

System	1960-61	1972-73	1979-85	1988-92	1998-99
Free Range	30.9	4.5	1.9	13.0	15.5
Battery Cage	19.3	88.1	96.1	85.0	80.1
Deep Litter	49.8	7.4	2.0	2.0	4.4

Source: *Poultry Health and Management*, 4th Edition, David Sainsbury.