

California Poultry Letter

University of California • Cooperative Extension

July-August 2000

Immunosuppressive Viruses – Setting Your Birds up for Disease

Immunosuppressive diseases don't always cause disease directly but they can set your birds up for infections with other agents, which then lead to mortality, condemnations, or loss of production. Immunosuppressive diseases interact with the host's immune system to depress reactions to infections making the birds incapable of protecting themselves from agents that would not normally cause disease.

Infectious Bursal Disease Virus (IBDV)

The most important of the immunosuppressive diseases is infectious bursal disease virus. This virus usually infects chickens when maternal antibody levels drop and before the birds are vaccinated. Infectious bursal disease is caused by a virus that replicates in the bursa and causes its destruction. The bursa of the chicken normally produces circulating lymphocytes that manufacture antibodies. IBDV can cause significant mortality and long-lasting immunosuppression in infected flocks.

Chicken Anemia Virus (CAV)

Another important immunosuppressive disease is chicken anemia. Clinical cases occur only in chicks that are the progeny of uninfected hens. Today, most commercial chickens are positive for CAV and are kept positive to prevent clinical disease. Even if there are no outward signs of disease, CAV can cause immunosuppression. Broiler flocks free of CAV outperform infected flocks even if there is no evidence of clinical disease.

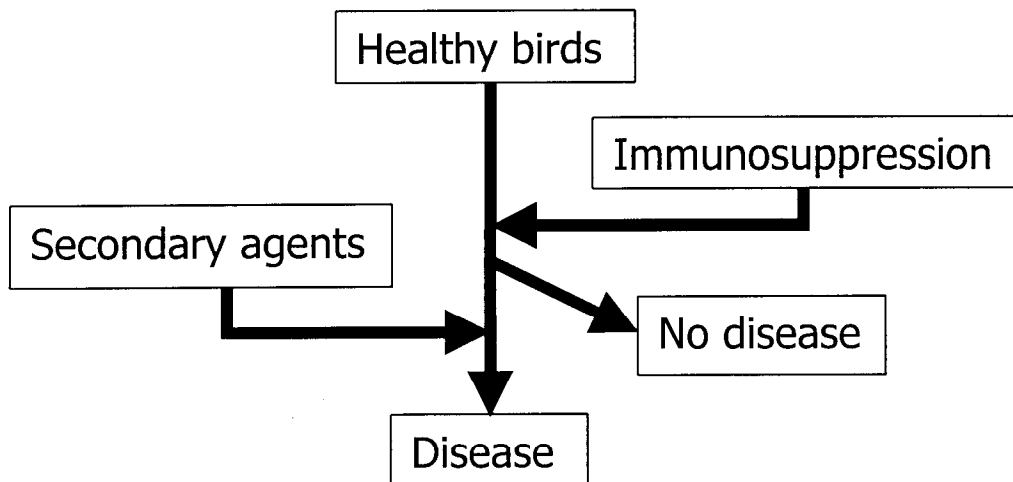
Hemorrhagic Enteritis Virus

The bloody intestines caused by hemorrhagic enteritis virus are rarely reported anymore. More common are infections that cause large spleens without the intestinal bleeding. Both types of infections are equally immunosuppressive and can lead to secondary infections.

The Role of Immunosuppressive Viruses in Disease Outbreaks

Before your current disease problem is blamed on immunosuppression, the complex factors that may lead to disease outbreaks should be considered. For example, finding chicken anemia virus does not necessarily mean it is causing immunosuppression, or had any part in a disease outbreak. Its importance depends on when the infection occurred, the dose of virus the bird received, the strain of the virus, the immune status of the host, and possibly the strain of the host itself. So, it is important to consider the complete disease picture when trying to determine the causes and solutions to problems that may involve a complex of infectious and non-infectious processes. The old-fashioned necropsy including an assessment of the organs of the immune system (bursa, thymus, and spleen) and correlation of that information with serology samples is essential to determining if immunosuppressive agents have played a role in any disease complex. Finally, even immunosuppressed birds can avoid secondary diseases if they are maintained in good environments. So, infection with an immunosuppressive agent does not automatically lead to other infections (see Fig. 1). They are predisposing factors to disease but only lead to disease if other agents are also present in the environment.

Figure 1. Schematic of how immunosuppression can act in combination with secondary agents to cause disease.



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Continue to Maintain Strict Biosecurity

There is evidence that low pathogenic Avian Influenza may still be present in Southern California.

Avian influenza (AI) virus was isolated from southern California commercial egg production chickens in February 2000. Subsequent epidemiological testing indicated viral exposure on the premises of several different companies. Laboratory examinations determined the AI virus present was consistently the low pathogenic H6N2 serotype. Affected companies and poultry health professionals have worked diligently to eradicate this virus from their flocks. Many sentinel birds have been placed and their status is being monitored. There is an indication that with the increased biosecurity measures in place and with the increase in summer heat, virus activity has greatly decreased. Reintroduction by wild birds is a continuous threat. The only realistic defense for the poultry industry is to maintain strict biosecurity procedures.

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Egg Defects and Hatchability

Incubation involves many variables. Hatchery managers and technical advisors often ask what effect particular egg defects have on hatchability. In a recent experiment, 5760 turkey eggs, of a large white commercial strain, were set over 24 experimental hatches and candled weekly until hatch at 28 days. All eggs were candled before setting and all detectible checks, shell defects or abnormal air cells were removed. Half of these eggs were stored for two days and half for 16 days before setting. Unexpectedly, candling during the incubation period revealed three types of air cell defects which either developed or became visible after the initial candling (Table 1). These were classified as tremulous air cells (air cell moves when candled), air cell positioned in the small

end of the egg and air cell on the side of the egg. These air cell defects were detected in 2.2% of the 5760 eggs.

These eggs were set and hatched under standard conditions for turkey eggs except that during the first week of incubation eggs were subjected to four carbon dioxide levels (0.1%, 0.3%, 0.5%, or 0.7%). Carbon dioxide levels did not affect hatch of eggs with defective air cells (P=0.22). Table 2 shows that the length of storage (2 vs.16 days) did not affect the number of defective air cells detected (P=0.22) or hatch of eggs with defective air cells (P=0.45). We don't know what caused these air cell defects or how often they may occur in turkey or chicken hatching eggs.

Table 1. Hatch of turkey eggs with air cell defects.

Air Cell Defect	Number Found in Sample*	Hatch of Fertile
Tremulous	34	11.8%
In Small End of Egg	41	31.7%
On Side of Egg	51	49.0%
Total	126	33.3%

*Sample 5760 eggs.

Table 2. Effect of storage on turkey egg air cell defects.

Storage (Days)	Air Cell Defects Found*	Hatch of Fertile
2	66	31.8%
16	60	35.0%

* Sample of 2880 per storage-day group.

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FOOD AND DRUG ADMINISTRATION "CURRENT THINKING" DOCUMENT FOR ON-FARM, PACKER/PROCESSOR, AND RETAIL STANDARDS FOR REDUCING SALMONELLA ENTERITIDIS IN SHELL EGGS

The following excerpts were taken from the "Current Thinking Papers on the National Standards for Egg Safety." This portion of the document deals with "On-Farm Standards." These rules are still under revision. Other sections deal with egg processing and retail sales.

On March 30, 2000, and April 6, 2000, FDA and FSIS held public meetings in Columbus, OH, and Sacramento, CA, respectively, to solicit and discuss information related to the implementation of the Egg Safety Action Plan and to gather information for reducing or eliminating the risk of SE in eggs. In an effort to expand the public process and build upon the two public meetings, FDA and FSIS are sharing their current thinking on the integral features of the farm-to-table egg safety standards to reduce egg-associated SE illnesses. Draft current thinking documents (on-farm, packer/processor, and retail) were made available for review, public discussion and comment at a public meeting July 31, 2000, at the Holiday Inn on the Hill in Washington, D.C. These documents represent current thinking and are not the agencies' final position. The agencies are sharing these current thinking documents with the public to receive input from interested stakeholders.

The entire document can be reviewed on our web site at:

<http://animalscience.ucdavis.edu/extension/avian/CurThkgDoc.htm> or at:

<http://vm.cfsan.fda.gov/~dms/egg0700.html>.

The President's Council on Food Safety has identified egg safety as one component of the nation's food safety program that warrants immediate federal, interagency

action. The Council developed an Egg Safety Action Plan to address the presence of *Salmonella enteritidis* (SE) in shell eggs and egg products using a farm-to-table approach. The Action Plan offers industry the flexibility to choose from two SE reduction strategies, each equivalent to meet the Action Plan's interim goal of a 50% reduction in egg-associated SE illnesses by 2005. Risk reduction in Strategy I is based on measures designed to reduce SE contamination of eggs during production, while risk reduction in Strategy II is based on measures designed to eliminate SE from contaminated eggs at the processor. In addition, the Action Plan has retail and education objectives to reduce the risk of SE illnesses. Proposed rules for egg safety standards are scheduled to be published in 2000, followed by publication of final rules in 2001 and implementation of the standards in 2002-2003. The proposed rules will be informed by estimates of the benefits and costs of regulatory options. FDA expects its proposed rule to be economically significant.

On-Farm Standards

Coverage

- Producers (other than those who sell all of their eggs directly to consumers (e.g., roadside stand operators) who provide eggs for the table egg market must comply with all requirements (Strategy I).
- Producers whose eggs will be treated to destroy SE must comply only with the refrigeration requirement below (Strategy II).
- All producers who sell eggs must register with FDA.

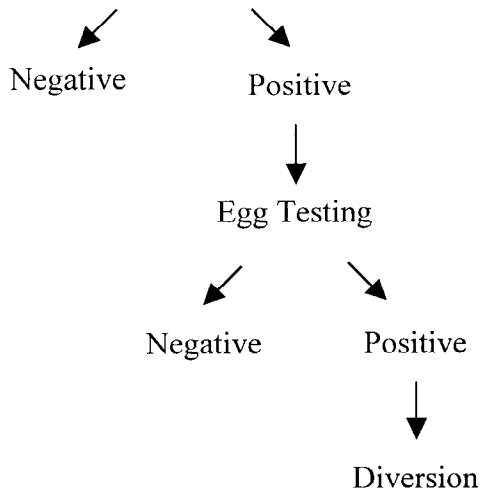
SE Risk Reduction Plan

Components may include:

- Use of chicks and pullets from SE-monitored breeder flocks
- Biosecurity
- Rodent and pest control program
- Cleaning and disinfection of poultry house, if house or eggs are SE-positive
- Use of Salmonella-negative feed
- Refrigerated storage of eggs held for more than 36 hrs after laying

Verification of the SE Risk Reduction Plan

Environmental Testing: 40-45 weeks of age + 25 weeks after end of each molting period (i.e., same time period as initial environmental test)



Administration of the SE Risk Reduction Plan

One individual at each production facility must successfully complete training on SE risk reduction measures for egg production. That individual is responsible for administering the SE risk reduction plan.

Record keeping Requirements

Producers will maintain a written SE risk reduction plan and records indicating compliance with all components of the plan.

2000 Calendar

August 22 -United Egg Producers Area Meeting, Doubletree Hotel, Ontario, CA

September 6-7 - California Egg Commission Annual Planning Meeting, Doubletree Hotel, Ontario, CA

September 8 - California Egg Quality Assurance Plan, Industry/Agency Meeting, **CEQAP MEETING POSTPONED.**

September 14-16 - International Egg Commission Marketing Seminar, Loews Ventana Canyon Resort, Tucson, AZ

Sept. 20-21 - CPF Annual Meeting and Conference, DoubleTree Hotel, Modesto (209) 526-6000. Sept. 20 Annual meeting and banquet. Sept. 21 conference 8 a.m. - 12 noon. For registration and information contact Bill Mattos 209/576-6355; or e-mail Mark Looker mllooker@ainet.com.

October 16-18 - National Poultry Waste Management Symposium, Sheraton Fontainebleau Hotel, Ocean City, MD. For more information contact Richard Reynnells 202/401.5352, e-mail rreynnells@reusda.gov or in California Ralph Ernst raernst@ucdavis.edu.

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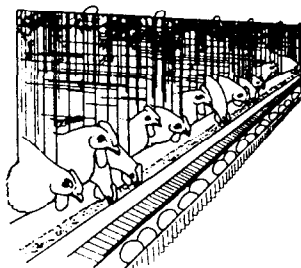
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