

**T**he National Poultry Improvement Plan (NPIP) was started in the early 1930s to coordinate State programs aimed at eliminating pullorum from commercial poultry. In those days, many poultry breeders served the needs of thousands of small flock owners. Today, there are only a very few breeders of commercial poultry to serve the commercial poultry industry, which produces billions of chickens and millions of turkeys annually. Today, the NPIP concerns itself with certifying that flocks are free of the following diseases:

- **Pullorum**—An egg-transmitted disease of poultry, caused by *Salmonella pullorum*, that kills a high proportion (60–80 percent) of baby poultry
- **Fowl typhoid**—An egg-transmitted disease of poultry, caused by *Salmonella gallinarum*, that may result in significant mortality in both baby poultry and adult birds
- **Avian mycoplasmas**—The species of *Mycoplasma* that are most pathogenic to poultry are the ones covered by the testing program in the NPIP: *Mycoplasma gallisepticum* (MG), *Mycoplasma synoviae* (MS), or *Mycoplasma meleagridis* (MM).
- **Salmonella enterica\***—An egg-transmitted disease of poultry, caused by the organism of the same name, that may also have human health implications through consumption of contaminated table eggs
- **Avian influenza**—A worldwide viral infection of several species of poultry

Pullorum disease, discovered in 1899, is a worldwide disease of chickens. The main reservoirs of infection are the egg-producing organs of the infected hen. Chicks from diseased hens are infected at conception inside the egg.

Pullorum disease will also affect turkeys, ducks, guinea fowl, pheasants, sparrows, quail, bittern, geese, pigeons, doves, parakeets, and canaries. The causative organism, *Salmonella pullorum*, rarely affects mammals.

Once called bacillary white diarrhea of chicks, pullorum has been a devastating disease of poultry for more than 50 years. It causes heavy losses in chicks and poultry and reduces the productivity of adult birds. Young birds die during their first 3 weeks. Losses may be as high as 80–90 percent of the brood. Death from pullorum rarely occurs after 4 weeks of age. Infected adult birds normally show no outward evidence of infection, but they are disease carriers for life.

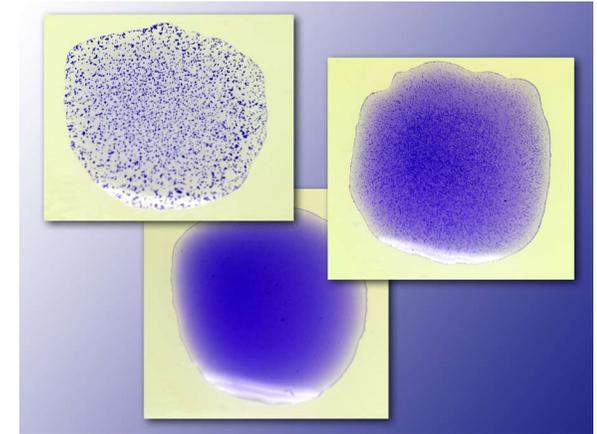
The infection may spread by breathing contaminated dust or coming into contact with down from infected poultry or with other material in the incubator, shipping box, brooder, or pen that has been touched by infected birds. Infected feces in litter and feed or water can transmit the disease to other brood-mates. One chick might infect an entire hatch of birds. If young birds have other diseases, pullorum tends to spread faster.

Carrier hens lay infected eggs, and the hatchlings are infected. Hens can be infected by eating contaminated feed, infected eggs, or manure from other infected chickens.

Blood-testing adult breeding birds, biosecurity, and sanitation have all but eliminated the disease in the United States. Pullorum-typhoid testing is available through State agencies as a free service or at a nominal charge. Individual poultry raisers may be certified by these State agencies as testing agents in some States.

Pullorum can be controlled and eradicated by eliminating infected carrier birds and thus breaking the disease cycle. Blood-testing potential breeding animals and culling infected birds are the steps needed to eliminate the eggborne disease. Breeders that have tested negative produce noninfected eggs and thus noninfected chicks.

The official blood tests of the NPIP for pullorum-typhoid are the rapid whole-blood plate agglutination test, the rapid serum plate test, the standard tube agglutination test, and the microagglutination test.



**Figure 1**—Results of the rapid whole-blood plate agglutination test for pullorum are positive (top left), suspect (top right), and negative (bottom). (Photo by Gene Lambert of Paradigm Media; reproduced by permission.)

These tests use whole blood or serum of infected birds, which contains antibodies that will clump (stick together, agglutinate) when mixed with stained pullorum organisms.

MG, MS, and MM are the species of *Mycoplasma* that are pathogenic to poultry.

MG is commonly called chronic respiratory disease in chickens and infectious sinusitis in turkeys. Producers with MG-affected flocks suffer economic losses from downgraded carcasses, lowered egg-production efficiency, and increased medication costs. MS can become systemic and cause acute synovitis of chickens and turkeys. MM's primary lesion is airsacculitis in baby turkeys.

Avian influenza is a worldwide viral infection of poultry. An influenza virus has the ability to mutate, or change its genetic character, so that it can infect a host animal in one of several ways. The host responses from influenza infection can range from no apparent signs to mild and moderate illness to death. Because of the different symptoms of influenza, three levels of host disease are described: nonpathogenic, low-pathogenic, and highly pathogenic avian influenza.

The agar gel immunodiffusion test is the official test for avian influenza under the NPIP. The test must be conducted only in laboratories authorized under the NPIP, and tissues from all suspects are subtyped at the National Veterinary Services Laboratories, Ames, IA.

Fowl typhoid is a salmonella infection similar to pullorum but caused by *Salmonella gallinarum*. Both diseases elicit common antigenic reactions. The same blood test works for both diseases. Since 1954, breeders are considered negative for both diseases on the results of the same test.

*Salmonella enterica*-infected chickens often display no symptoms at all. But because this disease is egg-transmitted, like pullorum, it can be passed in the intact egg. Because *Salmonella enterica* is a human pathogen, it must be eliminated from breeding chickens.

For more information, visit  
[http://www.aphis.usda.gov/animal\\_health/animal\\_dis\\_spec/poultry/](http://www.aphis.usda.gov/animal_health/animal_dis_spec/poultry/)

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Issued November 2001  
Slightly revised June 2009

**National Poultry Improvement Plan**  
1498 Klondike Road, Suite 101  
Conyers, GA 30094  
Phone: (770) 922-3496  
Fax: (770) 922-3498



United States Department of Agriculture  
Animal and Plant Health Inspection Service  
Program Aid No. 1708

## Helping You, the Poultry Breeder, Prevent Disease

