

Infectious Bronchitis and Its Effect on Egg Production and Egg Quality ¹

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Infectious bronchitis (IB) can be a devastating disease to any poultry operation. It affects chickens of all ages, types, and breeds. The disease is caused by a coronavirus which is known to have a high mutation rate. Thus, many serotypes (and subtypes) of IB virus exist in the United States and throughout the world. The arrival of new IB variants poses a continuous problem for the poultry industry.

The virus enters the body by the inhalation or conjunctival route. Infectious bronchitis is considered to be a highly contagious respiratory disease. Characteristically accompanying the disease are mild respiratory signs such as sneezing, snicking, gasping, and a watery discharge from the eyes and nostrils. In the respiratory tract, clear mucus and areas of inflammation are present. The mucus tends to accumulate in the lower part of the trachea and a mucus plug is sometimes found near the bronchi. Normally, if the virus spreads through the flock, all of the birds are affected. Many times the IB virus may spread through the flock without producing obvious clinical signs of disease except a mild cough. However, the virus may trigger a serious, long-lasting respiratory disease if *Mycoplasma gallisepticum* or *Mycoplasma synoviae* is present. The disease can be even more severe if complicated by *E. coli* infection.

Some strains of the virus, referred to as nephropathogenic IB viruses, infect the kidneys and cause permanent renal damage. Infected chickens excrete watery droppings, resulting in wet litter. Urates are common and can be identified easily in the droppings and in the kidneys and ureters at

necropsy. The kidneys of affected birds are pale, mottled, and can be 2 to 3 times their normal size. Even though mortality in uncomplicated IB outbreaks can be relatively low, infection with nephropathogenic strains may cause high mortality.

The commercial egg-laying chicken has a level of productivity second to none. However, an outbreak of IB in a developing pullet flock may have devastating effects on future productivity. The reproductive tract and kidneys can be permanently damaged. In adult hens, depending on the strain of virus, an outbreak of IB will cause varying effects on egg production. If hens have low antibody titers, production drops can be severe. In birds with high titers, the only manifestation of the disease will be mild to severe effects on both egg shell and internal quality without affecting overall egg production. If production drops occur from IB, a decline in shell as well as internal quality should be expected. The negative influence IB has on egg quality may persist for many weeks or months after production has recovered.

The IB virus infects many tissues in the body. Every portion of the reproductive tract can be affected. A decline in egg shell quality occurs when the uterus is directly affected. This decline is reflected as poor egg specific gravity caused by a decline in shell thickness, and misshapen eggs caused by degeneration and distortion of the shell gland cells. Pullets infected with IB virus early in life may suffer permanent damage to the oviduct, resulting in misshapen eggs being

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produced throughout their life. Also, impacted oviducts, ruptured ova, internal layers, and cystic right oviducts are often a result of early IB virus infection.

Infectious bronchitis is also known to affect shell pigmentation. Uniformity of pigmentation in brown eggs is poor. Pale eggs can appear 2 to 5 days after exposure to the virus. The occurrence of pale eggs can persist for several weeks. There are other causes of pale eggs, but IB should be considered when pale eggs occur.

One of the major effects that the IB virus has on internal egg quality is its influence on the albumin. It is common for “watery whites,” a serous thinning of the thick albumin, to occur in IB outbreaks. Thus, Haugh Unit values are greatly reduced. The watery albumin is a result of the IB virus destroying the endometrial mucin secreting cells in the magnum of the oviduct. The keeping quality of eggs from IB virus-infected hens is lessened. The decline in shell quality that accompanies IB out-breaks also promotes an accelerated decline in albumin quality.