



Section 4

## **Viral Diseases**

**Duck Plague**

**Inclusion Body Disease of Cranes**

**Miscellaneous Herpesviruses  
of Birds**

**Avian Pox**

**Eastern Equine Encephalomyelitis**

**Newcastle Disease**

**Avian Influenza**

**Woodcock Reovirus**

*Inclusion bodies in the liver of a bird that died of herpesvirus infection*  
Photo by Lou Sileo

# Introduction to Viral Diseases

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“The viruses almost surely antedate our species.” (Johnson)

“...viral emergence is essentially a two-step process: (1) introduction of the virus (whatever its origin) into a new host, followed by (2) dissemination within that new host population...That second step might not occur at all...However, changing conditions might increase the chances of this second step occurring.” (Morse)

Historically, viral diseases have not been recognized as major causes of illness and death in North American wild birds. Until relatively recently, this may have been due to inadequate technology to culture and identify these organisms. Unlike bacteria, viruses are too small to be seen under the light microscope and they cannot be grown on artificial media. Nevertheless, studies of infectious diseases caused by viruses have often predated discovery of the causative agents by many years as evidenced by smallpox immunizations being used centuries before that virus was identified. The isolations of a tobacco mosaic virus in 1892 and foot and mouth disease viruses in 1898 mark the development of virology as a distinct biological science. The era of modern virology began in the post-World War II years of 1945–50 with the application of cell culture techniques to the study of animal viruses.

For centuries, gross and microscopic pathology associated with tissue alterations caused by viral infections have been recorded for species of domestic birds, captive wild birds, and, occasionally, for free-living wild birds. However, significant concern about viral diseases in wild birds has primarily occurred since the 1970s. This timeframe is consistent with an apparent increase of emerging infectious diseases and emerging viruses in other species, including humans. It is noteworthy that this pattern exists for the diseases included in this section. Duck plague first appeared in

the United States in 1967 and the first major loss of wild waterfowl from duck plague occurred in 1973. Eastern equine encephalitis erupted in a captive breeding flock of whooping cranes in 1984; a highly virulent form of Newcastle disease virus has appeared several times among double-crested cormorants in Canada since 1990 and in the United States since 1992; and a previously undescribed reovirus was the cause of death for woodcock in 1989 and again in 1993. In 1978, inclusion body disease of cranes appeared in a captive crane breeding colony in the Midwestern United States; that outbreak was the first identification of this herpesvirus infection. In 1978 also, avian pox viruses were first isolated from free-living waterfowl and from bald eagles the following year.

Avian influenza has been included in this section to give wildlife resource managers basic information about this group of generally avirulent viruses that exchange genetic material to create new forms of the virus, some of which are capable of causing disease. Interest in influenza is primarily focused on the role of migratory birds as a source of viruses that infect domestic poultry and humans.

It seems likely that viral diseases will assume even greater future importance as causes of disease in wild birds. Greater attention needs to be given to the study of this source of disease, especially in captive-propagation programs intended for supplementing and enhancing wild stocks of birds.

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Quotes from:

Johnson, K.M., 1993, Emerging viruses in context: an overview of viral hemorrhagic fevers, *in* Morse, S.S. [editor], *Emerging Viruses*: Oxford University Press, New York, p. 46.

Morse, S.S., 1993 Examining the origins of emerging viruses, *in* Morse, S.S. [editor], *Emerging Viruses*: Oxford University Press, New York, p. 16–17.