



CHAPTER 1

AVIAN INFLUENZA IN WILD BIRDS: STATUS AS RESERVOIRS, AND RISKS TO HUMANS AND AGRICULTURE

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ABSTRACT.—Influenza A viruses are naturally reservoired in wild bird populations, in which they generally exist as low-pathogenic subtypes. Historically, concern about avian influenza virus (AIV) in wild birds is related to its potential effects on agriculture and human health, and not to health issues of wild bird populations. Several subtypes (primarily H5 and H7) have caused severe outbreaks of disease in domestic bird populations. In some cases, genetic and spatial temporal analyses suggest that these high-pathogenic subtypes may originate in wild bird populations that transmit low-pathogenic forms to domestic birds; after passage in domestic birds, the low-pathogenic subtypes convert to high-pathogenic subtypes. These observations suggest that monitoring AIV activity in wild bird populations, especially waterfowl, may improve risk assessment for poultry producers. Other cases, as exemplified by recent outbreaks of H5N1, suggest that the highly pathogenic subtypes have spilled over into wild populations from domestic production and live-bird markets in Asia. The risk paths (i.e. how the virus gets from waterfowl to domestic birds or vice versa) are not well understood and should be the subject of further research. The number of outbreaks of high-pathogenic AIV is increasing, as is the number of domestic birds that are culled in efforts to contain the spread of infection. These efforts have enormous economic implications. Surveillance has been focused on domestic production of these species. The role of the natural disease ecology of feral swine and quail in generation of avian and human reassortants has not been investigated, but is an area of concern. Direct transmission from birds to humans or other mammals is also possible, as evidenced by human infections caused by H9N2. Because the H5N1 subtype has become endemic to Southeast Asia, and because the human population is immunologically naïve, the concern of a pandemic is increased. Although there is little anyone can do about the natural reservoir of AIV in birds, increased information about how the viruses are maintained, transmitted, and moved across the landscape in nature would provide valuable information about agricultural and human-health risk assessment. *Received 5 August 2005, accepted 8 January 2006.*

RESUMEN.—Los virus de la influenza A se encuentran de manera natural en las poblaciones de aves silvestres, donde por lo general se encuentran como subtipos de baja patogénesis. Anteriormente, la preocupación sobre el virus de la influenza avícola (VIA) en aves silvestres, estaba relacionada con los efectos potenciales en la agricultura y en la salud humana, y no en asuntos sobre la salud de las poblaciones de aves silvestres. Algunos subtipos, especialmente H5 y H7, han causado severos brotes en poblaciones de aves domésticas. En algunos casos, análisis genéticos y de espacio-tiempo han sugerido que estos subtipos altamente patógenos pudieron haberse originado en poblaciones de aves silvestres que transmitieron formas de baja patogénesis a aves domésticas; y al suceder esto, los subtipos de baja patogénesis se convirtieron en subtipos de alta patogénesis. Estas observaciones sugieren que el monitoreo de VIA en aves silvestres, especialmente aves acuáticas, podría mejorar las evaluaciones de riesgo para los productores de aves de corral. En otros casos, como por ejemplo los recientes brotes de H5N1, sugieren que los subtipos altamente patógenos han sido transmitidos a las aves silvestres a través de las aves de corral y la comercialización de aves vivas en los mercados de Asia. Las vías de contagio (por ejemplo, la forma en que el virus pasa de las aves acuáticas a las aves

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