

## Sero-prevalence of avian influenza among broiler-breeder flocks in Jordan

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### Abstract

Thirty blood samples were collected randomly from each of the 38 breeder-broiler farms in Jordan. Serum samples were examined using indirect ELISA for specific antibodies to avian influenza virus. The overall true flock-level sero-prevalence of avian influenza was 71% (95% CI: 55,83). Positive flocks had 2–30 sero-positive chickens and half of flocks had >20 sero-positive birds. The number of sero-positive flocks varied in the studied localities with more sero-positives in farms located within the migratory route of migratory wild fowl. The examined broiler-breeder flocks had no clinical signs, or noticeable decrease in egg production; mortalities were within the normal range (0.1–1%). The number of positive sera/flock correlated with flock size. There were a no significant (Pearsons  $r = 0.21$ ,  $p = 0.21$ ) correlation between positive flocks and age. A non-pathogenic AI virus infects broiler-breeder farms in Jordan. Wild local and migrating birds might promote the further spread of this virus in Jordan and other countries.

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## 1. Introduction

Avian influenza (AI) is a respiratory disease of poultry caused by influenza virus A of the family Orthomyxoviridae. The disease is of an economic significance to the poultry industry worldwide (Easterday et al., 1997). For example, the total estimated cost (adjusted to 2001) of the highly pathogenic H5N2 virus outbreak in poultry during the years 1983–1984 in the northeastern USA was \$588 millions (Swayne and Halvorson, 2003).

AI viruses cause natural infection in a variety of domestic and wild bird species throughout the world (Swayne and Halvorson, 2003). Influenza A virus infection in poultry occurs in two forms. The highly pathogenic AI (HPAI; previously known as “fowl plague”) causes a severe systemic disease with mortality up to 100%, and the low-pathogenic AI (LPAI) usually causes minimal clinical signs other than a slight drop in egg production (Alexander, 2000).

HPAI derivatives emerged from LPAI H5 by mutation in a combination of in vitro and in vivo experimental systems (Brugh, 1988; Ohuchi et al., 1989; Brugh and Perdue, 1991; Perdue et al., 1996; Swayne et al., 1997). Wild waterfowl (especially ducks) serve as natural reservoirs and important sources of infection to domestic waterfowl and poultry (Easterday et al., 1997). Sporadic cases of influenza caused by the entire AI viruses were reported in humans (Swayne, 2000).

During 1998–2000, H9N2 viruses were reported in Middle Eastern countries and were responsible for widespread and serious disease in commercial chickens in Pakistan (Naeem et al., 1999, 2003), Iran (Nilli and Asasi, 2002, 2003), the United Arab Emirates (Manvell et al., 2000) and Saudi Arabia (Banks et al., 2000). Phylogenetic analysis of H9N2 isolates from Pakistan, Iran and Saudi Arabia showed very close relationships – suggesting a common source (Banks et al., 2000). Numerous infections of poultry and other birds with the subtype H9 during the 1990s originated from separate introductions from feral birds (Banks et al., 2000).

Jordan is on the route of migratory wild birds and has local wild and feral birds. However, AI infection was never investigated in poultry in Jordan. We described the seroprevalence of AI in all operating broiler-breeder flocks in central and southern Jordan during October to December 2001 and the association of the seropositivity with flock size and age.

## 2. Materials and methods

### 2.1. Birds and study area

The survey was conducted during October to December 2001 in the central and southern area of Jordan. A total population of 872,500 broiler-breeder chickens is distributed over the 38 operating broiler-breeder farms in the area (Anon, 2001). Each farm has 1–6 houses. The houses were built of brick and cement with metal-plate roofs and are of different sizes. Table 1 shows the quartiles for age, hen-day egg-production percent, flock size and total mortality percent of AI sero-positive and sero-negative broiler-breeder flocks. The farms

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