Population dynamics in Kampong chicken and consequences for HPAI vaccination: Results of a field trial in Java

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Photo: Unger, Yogyakarta Province, Java, 2009

INTRODUCTION

Until today highly pathogenic avian influenza (HPAI) of the subtype H5N1 in poultry is considered to be endemic in most of the Indonesian provinces since it was officially declared in 2004. Vaccination is used as one of the control strategies targeting layer and breeder farms but also Kampong (village) chicken. Limited information is available on the scope of off-take and replacement occurring in Kampong chicken populations under field condition and their effects on HPAI vaccination. Therefore the presented field (community) vaccination trial was designed.

OBJECTIVES

To evaluate the effects of a continuous off-take and replacement – naturally occurring in Kampong chicken populations – on antibody profiles under filed conditions.

MATERIALS AND METHODS

The purpose of these trials was to compare flock antibody profiles resulting from quarterly vaccination programs that employed either a single dose regimen or a primary vaccination followed in 21 days by a booster shot in naturally occurring Kampong chicken populations with typical age profiles and exit/entries. Twelve communities with estimated chicken populations of 300-500 each were enrolled in the study: six in Sleman District and six in Kulon Progo District, Yogyakarta, Java. The trial was carried out between July 2008 and August 2009. Four communities were assigned to a booster vaccination regime, four to a single vaccination regime, and four remained as un-vaccinated control communities. Chicken numbers were monitored collected in weekly intervals. Serological samples were collected in six-week intervals, 60 per community and up to five per selected household from randomly selected chickens, and subjected to HI (H5) testing.

RESULTS

Results of HPAI serology – Booster vaccinations resulted in significantly higher overall individual HI (H5) titres over the field trials at all sampling dates.

Poultry population results - indicate that 39-44% of chickens were younger than two months of age over time and more than two-thirds of chickens were younger than four months, respectively. Adult chickens represented only 10% (male) and 20% (female) of the total population (Figure 2). Though overall population size within the selected communities was relatively stable, the number of chickens changed widely within age classes. In each observed quarter, there was a 43% or higher turnover of the population (Table 1). Observed changes were related to socio-cultural events such as holidays or begin of school.

CONCLUSIONS

From our results we can conclude that approximately 40% of a natural backyard population will be un-vaccinated by 60 days after the onset of a vaccination campaign. Considering this high population turnover rate, even a quarterly vaccination regime including a booster round is required will have difficulty achieving effective flock immunity levels. This results in high costs, poses a significant logistical challenge and suggests mass vaccination is not a practical approach to sustained control of HPAI in Kampong (village) chicken populations.

Figure 1: All chicken were leg or wing banded

Photo: Unger, Yogyakarta Province, Java, 2008

Figure 2: Average proportion of the total chicken population by age class in enrolled communities over time, Yogyakarta, Java
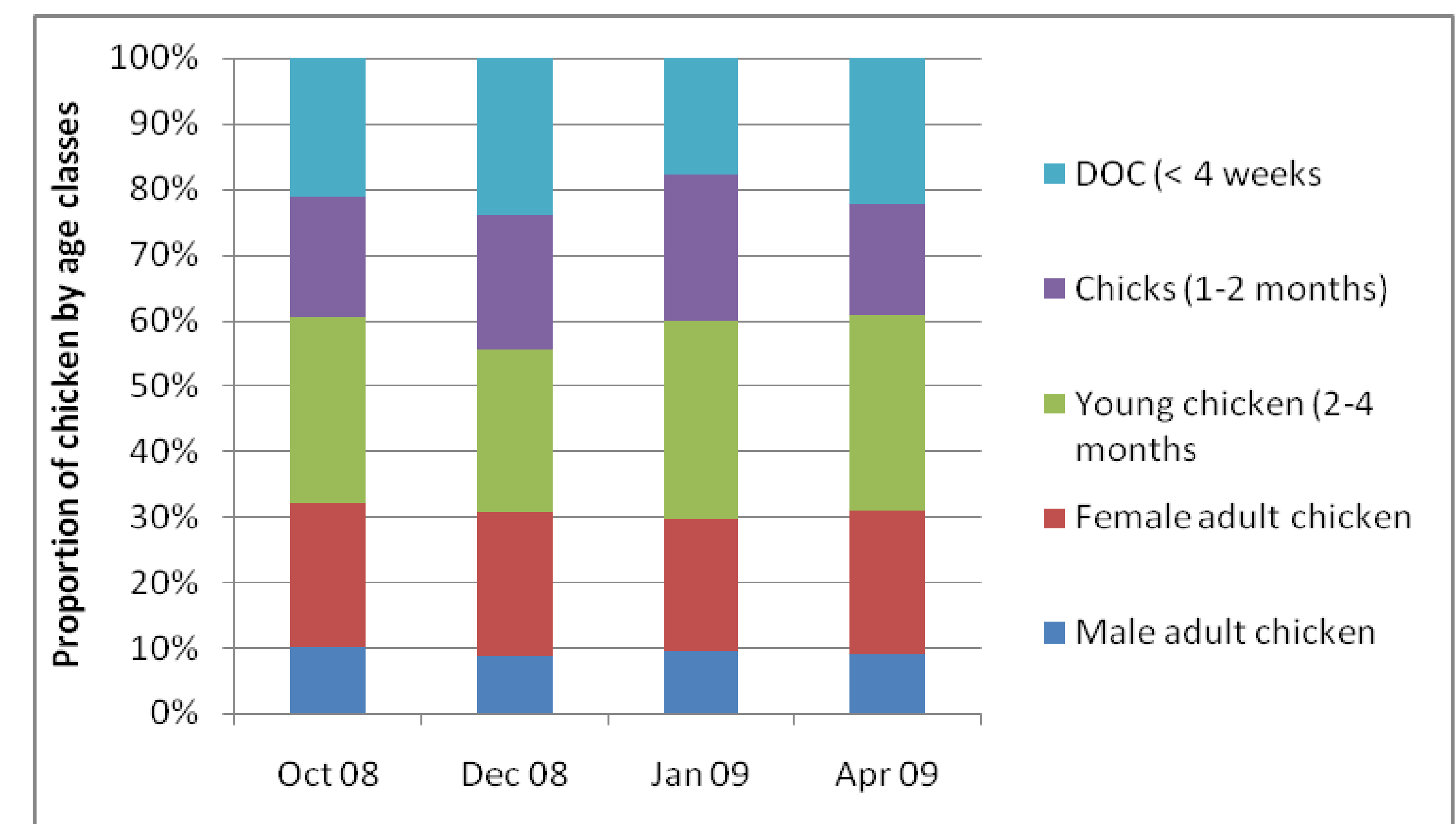

Table 1: Change of population over time for Sindutan A and Kalimanjung community over time, Yogyakarta, Java

		Jul - Oct 2008	Oct 2008 – Jan 2009	Jan – Apr 2009
Kalimanjung				
	Total entries	72%	58%	49%
	Total Exits	69%	56%	51%
Sindutan A				
	Total entries	56%	43%	49%
	Total Exits	19%	44%	68%