

Poultry health and disease control in developing countries

Poultry disease diagnosis: field skills and laboratory procedures

Trevor J. Bagust, *Department of Avian Medicine, Faculty of Veterinary Science, University of Melbourne, Australia*

FIELD SKILLS

It is extremely important to apply a *systematic* approach when conducting field investigations. An autopsy (necropsy) is essential for avian veterinarians or technical services personnel seeking to establish a preliminary diagnosis. The autopsy also allows samples to be collected and submitted to a diagnostic laboratory for confirmatory testing. Samples collected may include blood, serum, plasma, swabs, feathers, tissues, scrapings or smears, as needed for confirmation or exclusion of the potential causative pathogens. Excellent video-based information on practical procedures for clinical examination and sample collection can be accessed at <http://partnersah.vet.cornell.edu/>.

Two of the best general-audience articles available on flock health and poultry diseases diagnosis were published in the international poultry industry technical periodical *World Poultry* (Yegani, Butcher and Nilipour, 2005a; 2005b). These articles can be accessed directly by using the hyperlinks shown for each.

LABORATORY PROCEDURES

The following comments confirm and extend the key information in these two articles.

Serology is the most frequently used of the three diagnostic approaches. However, it should be noted that detection of antibody can only be an indicator of previous exposure to a pathogen. Serology is nearly ideal for application in flock health surveillance, as laboratory testing can be conducted quite readily, for both the collection and the examination of large numbers of samples from multiple flocks. Serological activities in flock health surveillance may also include monitoring the effectiveness of vaccination programmes.

Microbiological investigations – bacteriology and virology: Yegani, Butcher and Nilipour (2005b) explain briefly where these tests are used in the modern industry. The following are their main advantages and disadvantages:

Histopathology is relatively economical, quick and useful for obtaining results, and the samples are easy to collect, store, transport and process. The downside of histopathology is that once a set of samples has been placed in fixative, the culture and typing of a pathogen is usually not possible.

Microbiology, whether bacterial or viral, it is invaluable for the isolation and culture of pathogens. However, the practitioner must exercise care to avoid cross-contamination when collecting the samples, and to prevent inactivation of infectivity during transport to the laboratory.

Routine aerobic bacterial culture is not expensive, other types of culture and typing usually are.

Culture of avian viruses is sometimes required, especially when field disease presentations are atypical or the emergence of a variant form of a viral pathogen (e.g., infectious bronchitis virus) is a possibility. The disadvantages of virus culture are that it requires time – often about a week – and using culture systems is moderately expensive.

PCR (polymerase chain reaction): This test system is highly sensitive and specific, which can be a problem. If the reagents (e.g., the primers) used are not an exact match with the pathogen in question, false negatives will occur. False positives, through contamination while a test is in progress in the laboratory can also be a problem.

Note: No laboratory test can return perfect results every time, and laboratories are not infallible. Veterinarians and technicians should always keep in mind the point made by Yegani, Butcher and Nilipour:

“It is important, when investigating poultry production-health problems, that you do NOT rely SOLELY on the results of diagnostic tests”.

REFERENCES

- Morrow, C.** 2008. Laboratory investigation to support health programmes and diseases diagnosis. In M. Pattison, P.F. McMullin, J.M. Bradbury and D.J. Alexander, eds. *Poultry diseases*, 6th edition, pp. 39–47. Philadelphia, Pennsylvania, USA, Saunders Elsevier. ISBN: 978-0-7020-2862-5.
- Yegani, M., Butcher, G.D. & Nilipour, A.H.** 2005a. Monitoring flock health: an absolute necessity – Part 1. *World Poultry*, 21(6): 40–41. <http://www.worldpoultry.net/chickens/housing/broiler/monitoring-poultry-flock-health%3B-an-absolute-necessity--part-i-6160.html>
- Yegani, M., Butcher, G.D. & Nilipour, A.H.** 2005b. Monitoring flock health: laboratory approaches – Part 2. *World Poultry*, 21(7): 32–33. <http://www.worldpoultry.net/chickens/management/prevention-control/monitoring-poultry-flock-health%3B-laboratory-approaches--part-ii-6122.html>

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned. The views expressed in this information product are those of the author(s) and do not necessarily reflect the views of FAO.