



Fowlpox: Identification and Adoption of Prophylactic Measures in Backyard Chickens in Bahia, Brazil

■ Author(s)

Silva PS da¹
Batinga T de B²
Sales TS³
Herval EFG⁴
Ramos I⁵
Maia PCC⁶
Fernandes LMB⁷

¹ DVM, Poultry Health Laboratory of Bahia (LASAB)/UFBA.

² DVM, Poultry Health Laboratory of Bahia (LASAB)/UFBA.

³ DVM, graduate student in Tropical Animal Science, School of Veterinary Medicine / UFBA.

⁴ DVM, graduate student in Tropical Animal Science, School of Veterinary Medicine / UFBA.

⁵ DVM, Poultry Health Laboratory of Bahia (LASAB)/UFBA.

⁶ DVM, M. Sc. in Animal Pathology, Professor of the Department of Preventive Veterinary Medicine, School of Veterinary Medicine /UFBA.

⁷ DVM, Ph.D. in Immunology, Professor of the Department of Preventive Veterinary Medicine, School of Veterinary Medicine/UFBA, coordinator of the Poultry Health Laboratory of Bahia (LASAB)/UFBA.

■ Mail Address

Priscila Sousa da Silva
E-mail: estrelamaior@gmail.com

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ABSTRACT

This paper describes the identification of an outbreak of fowlpox in backyard chickens in two villages the state of Bahia, the intervention strategy to control the disease by adopting health measures and vaccination, as well as the impact of the intervention. The diagnosis was based in clinical and laboratory data. After the diagnosis was confirmed, control measures and the vaccination of non-infected birds were recommended. Finally, the impact of the intervention on re-incidence of the disease was evaluated. A number of 700 chickens was vaccinated, after which only 9% of the farmers reported the occurrence of new cases, and 70% informed the acquisition of new birds after vaccination. The information reported in this paper can be useful to design strategic plans to control fowlpox in backyard chickens.

INTRODUCTION

Fowlpox is a viral disease characterized by proliferative and nodular lesions in the featherless parts of the skin or fibrino-necrotic and proliferative in the mouth, esophagus, and mucous membrane of the upper respiratory tract (Hsieh, 2005). Clinical signs may vary according to host susceptibility, virulence of the virus strain, and lesion distribution (Tripathy & Reed, 2003). The disease has been described in chickens, turkeys, pigeons, ostriches, quails, pheasants, and canaries (Back *et al.*, 1995), and the emergence of outbreaks is associated to environmental conditions, vector populations, and the habits of the affected species (Hansen, 1999; Van Ripper III *et al.*, 2002).

Fowlpox is globally distributed (Isa *et al.*, 2002; Tripathy & Reed, 2003; Pledger, 2005), despite being considered recent in North America (Pledger, 2005). The incidence is higher in tropical and subtropical countries (Beytut & Haligur, 2007). This disease is economically important in commercial poultry production, as it may cause decline in egg production, mortality (Isa *et al.*, 2002; Ariyshi *et al.*, 2003), and lower growth rate (Isa *et al.*, 2002).

However, in addition to commercial poultry production, small farmers are also affected. Despite the increase in the number of backyard chicken farms in the last few years, little attention has been given to the health care and diseases of these birds (Santos, 2005).

According to Caporal & Costabeber (2000), rural extension is the process of intervention that has an educational and transforming character. This process is based on participating investigation-action methodologies that promote the development of social-economic-cultural practices, allowing the participants of the process to build and to systematize knowledge in order to consciously change reality. In this context, the Poultry Health Education Group (GESAV), which includes undergraduate students of the School of Veterinary Medicine of the

Federal University of Bahia (EMEV/UFBA), has carried out research and extension activities in rural communities aiming at developing management and production practices for backyard chickens. The identification of health problems and the recommendation of prevention and control alternatives are emphasized (Batinga *et al.*, 2007).

This study aimed at reporting fowlpox incidence in backyard chickens in two villages in the state of Bahia, describing the prophylactic measures adopted to control the infection, and evaluating the impact of the intervention measures on the reemergence of the disease.

MATERIAL AND METHODS

The study was carried out in the villages of Terra Branca and Tatu, located in the district of Algodões, Quijingue, Bahia, Brazil. The municipality of Quijingue is located in the northeastern region of the state of Bahia, in the micro-region of Euclides da Cunha, located 322 km from the state capital city, Salvador.

The villages were visited three times. Terra Branca and Tatu were visited for the first time on November 3 and 4, 2006, respectively. During this first visit, the students organized a field day with the local farmers, when the participants discussed the most frequent problems found, and assessed the activities being carried out. The farmers' notes and observation indicated that most backyard birds from those villages could be suffering from fowlpox.

In order to investigate this suspicion, the students visited the local farms and the disease was clinically diagnosed by the lesions in the featherless skin parts of the birds. In addition, samples were collected and placed in formaldehyde at 10% for subsequent laboratory diagnosis. Samples were submitted to the Pathology Lab of the Veterinary Hospital of UFBA, and analyzed according to the method described by TIMM (2005).

Between January 16 and 20, 2007, the villages were visited a second time to provide the farmers with general guidelines for fowlpox prevention, and to vaccinate the birds against the disease. A freeze-dried vaccine against fowlpox (Hertape Calier) was applied. The flask was opened at the time of use, and was kept in a styrofoam box to ensure the preservation of the optimal temperature, as this is a live vaccine. Bird vaccination was carried out by a wing puncture using a vaccine applicator. Approximately 700 birds were vaccinated.

On April 29 and 30, 2007, meetings were carried out with the farmers of the two villages, and questionnaires were applied to assess the impact of the adopted prophylactic measures.

RESULTS AND DISCUSSION

The clinical signs observed in the flocks of the visited villages were similar to those reported by Jacob *et al.* (1998) in an extensive chicken rearing system in the USA. Those authors observed lesions in the skin and/or mouth and upper respiratory tract membranes, low growth rate, poor feed efficiency, and reduction of egg production. Beytut & Haligur (2007) described a similar condition in naturally-infected chickens in Turkey, where the birds presented conjutivitis, depression, anorexia, and crusts or nodules in the skin, comb, wattle, and eyelids.

In order to further investigate the problems, some farms were visited to observe the birds and the general conditions of the farms, looking for environmental factors that could favor the disease. Extensive crusty lesions were found on the corner of eyes and ears, which are consistent with fowlpox (Figure 1).

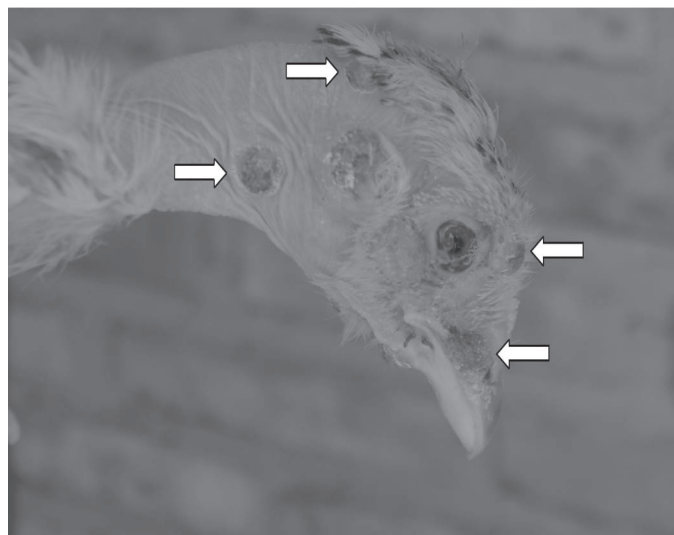


Figure 1 - Fowlpox skin lesions in a backyard chicken of the village of Tatú.

Butcher & Rossi (1990) mention that fowlpox is a disease that can be readily diagnosed by veterinarians, based on the flock's history and the presence of typical lesions. However, in some instances, the microscopic examination of the affected tissues may be required. During the visits to the flocks, material was collected for laboratory diagnosis. The material was stored according to the recommendations of Borja (2007), and

subsequently processed at the Pathology Lab of the Veterinary School of UFBA. The histological examination confirmed the suspicion of fowlpox, revealing the presence of Bollinger bodies, which are characteristic of this viral infection (Figure 2). These inclusion bodies cause cytoplasmic distention, resulting in cell necrosis (Tanizaki *et al.*, 1986; Yoshikawa & Alam, 2002; Beytut & Haligur, 2007).

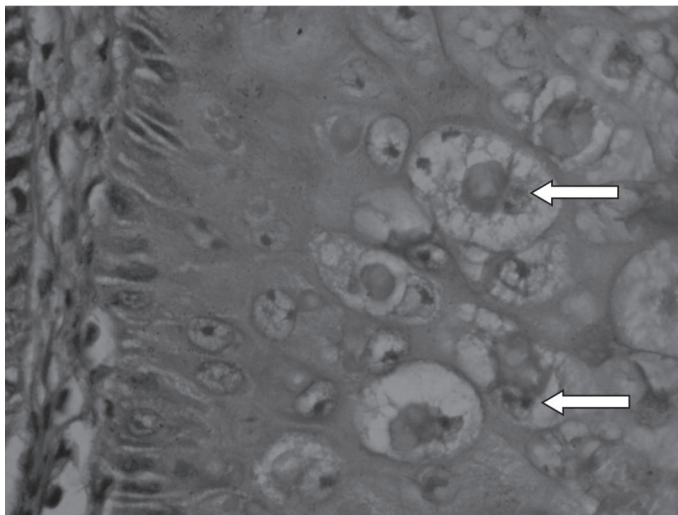


Figure 2 - Presence of eosinophilic and circumscribed agglomerate (Bollinger bodies) in the cytoplasm of some cells.

The main aim of the second visit - two months after the first visit - was to vaccinate birds and to check general management conditions. The representatives of the communities were previously contacted, and the vaccination day was scheduled. The farmers were asked to have the birds gathered the previous day, placing them in enclosures to make the vaccination process easier.

Butcher & Rossi (1990) suggest vaccination as a prevention measure against fowlpox, associated to insect control. Those authors emphasize, however, that only healthy birds should be vaccinated, as the vaccine induces mild infection.

There were no problems during vaccination. Most flocks were vaccinated, except for those which owners were not present or did not allow their birds to be vaccinated. Approximately 700 birds were immunized, and this number was considered satisfactory, as 93.9% of the flocks consisted of less than 30 birds.

Although vaccination is the main prevention strategy suggested in literature, many authors point out that the efficacy of the vaccination programs is very variable, and depend on epidemiological conditions (Butcher & Rossi, 1990; Figueiredo *et al.*, 2001; Permin & Pedersen, 2002).

The vaccine against fowlpox can be purchased in the capital city, Salvador, and other localities of the state of Bahia, where commercial poultry production is an important economic activity. Nevertheless, dwellers of distant villages have no knowledge of the existence of this vaccine, nor have veterinary technical services available.

Permin & Pedersen (2002), in studies carried out in Africa and Asia, observed that most small farmers did not vaccinate their birds against fowlpox.

When farmers do not have access to the vaccine to prevent the disease, farmers apply traditional home-made treatments when birds present skin lesions. The application of burnt oil, powder, or lemon is a common practice when warts emerge. Jugessur *et al.* (2006), in a study developed with small poultry farmers of the Republic of Mauritius, described a traditional treatment for fowlpox based on iodine, tomato, and cooking oil or shoe polisher.

However, to date, no single treatment for fowlpox has been successfully developed. Antibiotics can be used to control secondary bacterial infections, particularly in birds with respiratory and gastrointestinal lesions (Pledger, 2005).

The communities were visited again three months after vaccination. Between the second and the third visits, contact was made by telephone. During the third visits, meetings were held, and questionnaires were applied to assess the impact of the adoption of the prophylactic measures recommended. In both communities, the women are usually the family members responsible for bird care. This had already been observed in another study performed in the state of Bahia (Batinga, 2007) and it is consistent with information published by FAO (Food and Agriculture Organization) in 2006. The Coordinated Research Council (CRC) on Family Poultry Production of FAO concluded that, in 13 countries of Africa, women are also the main responsible people for the domestic rearing of chickens, and pointed out that better poultry performance may generate better life conditions to women and children (FAO/IAEA, 2006).

Table 1 - Answers obtained in the questionnaires, in %.

Items of the questionnaire	Yes	No
Women are responsible for bird care	81%	19%
Disease observation after vaccination	9%	91%
Introduction of new birds after vaccination	70%	30%

Butcher & Rossi (1990) stress that the fowlpox virus may remain stable for a long time in the environment,



favoring the infection of new birds introduced in the affected farms.

Today, the disease is under control in both villages where the intervention was carried out, as farmers have not reported the incidence of new outbreak, as informed by local representatives. However, further work must be developed both in the studied villages and in other communities to develop prevention strategies and to implement health education programs, which should be coordinated by government authorities. These programs should enhance the capacity of disease identification, after which, in a partnership with the community, a control and prevention plan based on general and specific measures should be developed. The plan must consider environmental and management characteristics, such as rainfall period, and consequently the presence of vector insects, as well as the frequency of introduction of new birds in the flocks.

CONCLUSIONS

The present article describes the process of clinical and laboratory identification of fowlpox in backyard chickens reared in two villages in the state of Bahia, Brazil. Based on this identification, we report the recommended and applied prophylactic measures to control the disease, and discuss the impact of these measures on the reemergence of the disease. Although fowlpox is responsible for significant economic losses, particularly for small farmers, and can be controlled by vaccination and the implementation of hygiene measures, to date there are no established programs for the diagnosis and prevention of this disease in backyard chicken farming. Considering the importance of family poultry production to ensure food and income to small farmers, it is essential to develop strategies to reduce the losses caused by fowlpox.

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