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BRIEF NOTE

**UNIDENTIFIED VIRAL PARTICLES COULD BE ASSOCIATED
WITH ENTERITIS OF VARIOUS COMMERCIAL BIRD SPECIES**

H.J.A. Fleury ⁽¹⁾, **G. Morere** ⁽¹⁾, **N. Demarquez** ⁽¹⁾ and
A. Vuillaume ⁽²⁾

⁽¹⁾ *Laboratoire de Virologie, Université de Bordeaux II,
33076 Bordeaux (France), and*
⁽²⁾ *Direction des Services Vétérinaires,
40000 Mont-de-Marsan (France)*

Commercial bird production is of great economic importance in the southwest of France (Aquitaine). Two main parameters can be considered; flesh pigmentation and the food conversion index. A decrease in these parameters can have serious consequences upon the classification («label») of the animals and therefore upon commercial benefits; such a decrease may be associated with an enteritis syndrome, as has been observed in various species of commercial birds in Aquitaine since December 1985.

In March 1986, 32,000 15-day old and 32,000 8-week old guinea fowls exhibited a decrease in food consumption, accompanied by prostration, loss of weight and diarrhoea; all animals died within 5 weeks. Necropsy confirmed thinness, dehydration and enteritis; moreover, it revealed typhlitis, necrotic pancreatitis, congestion of the liver with dilatation and hypertrophy of the gallbladder and atrophy of the spleen plus nephritis. No macroscopic lesions could be observed in the lungs, heart or brain. Histopathological study confirmed necrotic pancreatitis with lysis of exocrine cells and infiltration of mononuclear cells; such an inflammation could be observed in the liver. In July 1986, 5-week old animals in an enclosed area exhibited the same disease; all macroscopic and microscopic observations were as described above.

In October 1986, 2 batches of 3-week old muscovy ducks exhibited nervous signs, lateral balancing of the head, incoordination, difficulty in standing and

enteritis. Mortality was estimated at 0.5 % per day. Necropsy confirmed enteritis and revealed necrotic pancreatitis, hypertrophy and congestion of the spleen, liver and kidneys, destaining of the myocardium and inflammation of the liver and kidneys with mononuclear cells.

From December 1985 on, chickens of various ages (2, 4, 8 and 10 weeks) were afflicted; they exhibited nervousness, poor feathering, an increased incidence of leg problems, unfitness for human consumption, elevated food conversion index, enteritis, malabsorption and stunted growth.

In May 1987, 3-week old turkeys exhibited typhlitis, enteritis, necrotic pancreatitis with hypertrophy of the gallbladder and nephritis. The mortality rate was high.

In all cases, parasitic, mycologic and bacteriologic investigations yielded poor, inconsistent results; *Salmonella orio* variety 15+, *Candida albicans* and *Salmonella agona* were isolated. No parasites, *Campylobacter* or mycoplasmas could be isolated.

Pooled samples of cloacal, intestinal, pancreatic and liver specimens from some of the various birds were suspended in Hank's basic saline solution supplemented with antibiotics and centrifuged at 5,000 g for 20 min to eliminate cellular debris; the supernatants were then inoculated into 9-day old embryonated fowl eggs by the allantoic route and, after 3-day incubation at 36°C, the allantoic fluids were tested for haemagglutination (HA) of guinea pig red blood cells (RBC). Only one sample (from a chicken) had low HA activity; the corresponding allantoic fluid was spun at 100,000 g for 10 min in a «Beckman Airfuge» centrifuge and the pellets applied to copper grids and stained with phosphotungstic acid before observation in a «Philips 201» electron microscope; enveloped viral particles with a diameter of 100 nm and covered with 12-20-nm long club-shaped spikes were observed (fig. 1A); they were considered to be corona-like viruses. A haemagglutination inhibition test was performed with an antiserum to avian infectious bronchitis virus (IBV) and was negative; unfortunately, after having been frozen at -80°C, the corresponding HA-positive allantoic fluid could no longer be passaged in embryonated eggs.

The same supernatants were processed and observed by electron microscopy (EM), as described above for HA-positive allantoic fluid. In one case (a sample from a guinea fowl), we observed a corona-like virus with morphological characteristics similar to those described for the corona-like virus from the chicken. In most cases, we observed numerous virus-like particles (figure 1B, C, D and E); they were pleiomorphic, ranging from 100 nm to 400 nm in diameter and were covered with spikes, the length of which was estimated to be 15-18 nm. One of the corresponding samples (obtained from a muscovy

EM = electron microscopy.
HA = haemagglutination.

IBV = infectious bronchitis virus.
RBC = red blood cell.

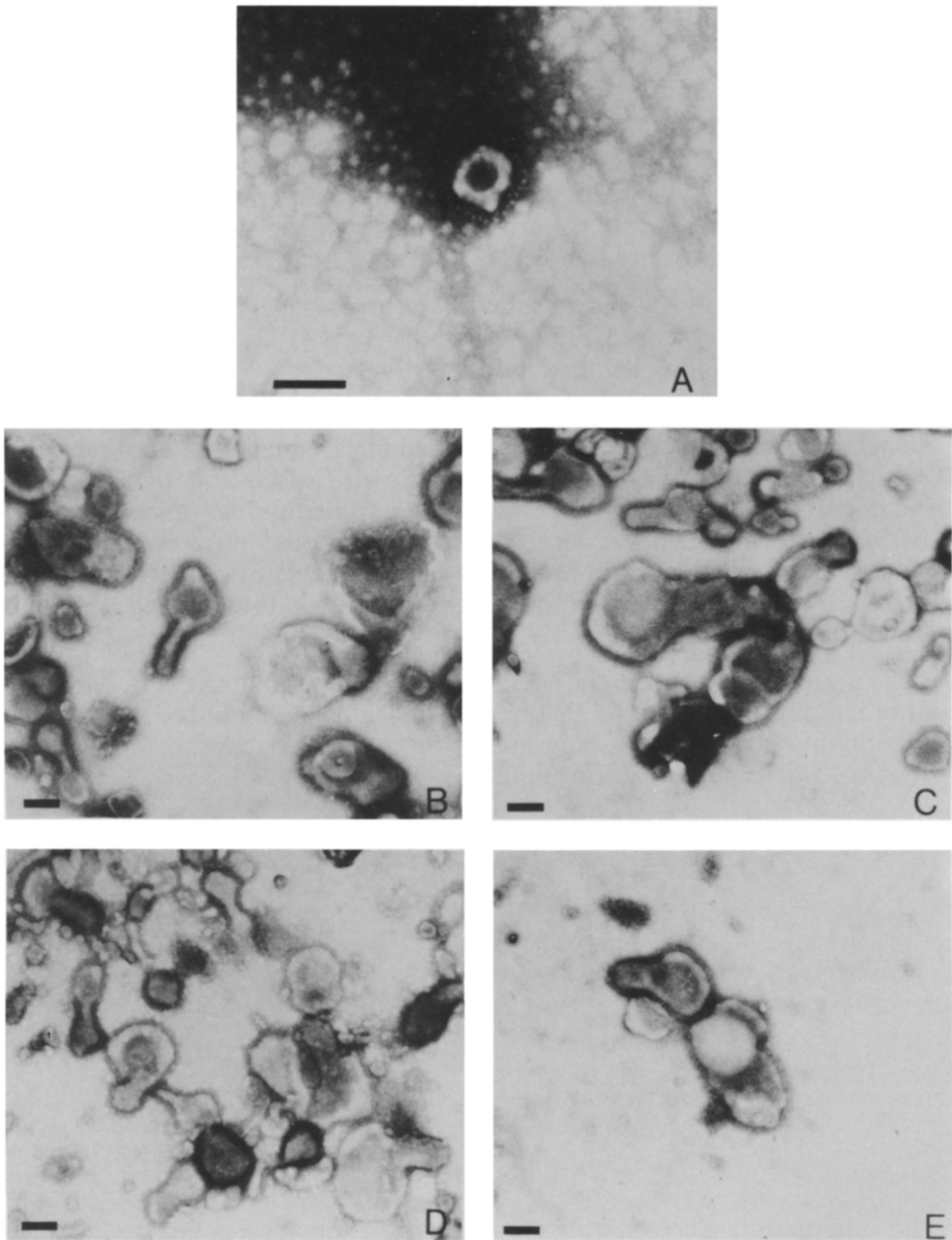


FIG. 1. — *Viral particles observed in electron microscopy of samples from various commercial bird species with enteritis.*

Bar represents 100 nm.

A) Corona-like virus particle from a chicken.

B, C, D, E) Unidentified virus particles displaying similar morphology in samples from a guinea fowl (B), a muscovy duck (C), a chicken (D) and a turkey (E).

duck) was inoculated into chick fibroblasts, Vero cells (a cell line from monkey kidney) and HRT-18 cells (a cell line from human intestine) with no noticeable cytopathic effect nor haemadsorption of guinea pig RBC; the supernatants of cell cultures were processed for and observed by EM; no virus particles could be observed.

Two members of the coronaviridae family, IBV and turkey coronavirus, are known to infect avian species; more recently, a corona-like virus has been isolated from pheasants with nephritis [5]; in our study, we observed corona-like virus particles in only two cases, and were unable to identify them.

We observed no reoviruses, rotaviruses or picornaviruses, as has been reported in acute and chronic diarrhoea of turkeys [1, 2, 3]. No adenovirus-like particles resembling hemorrhagic enteritis virus [2, 7] were visualized in our study.

The major finding in this study was the high frequency of viral particles displaying similar morphology (whatever the bird species) and which could be compared to viruses of the families *Paramyxoviridae* and *Orthomyxoviridae*; recently, similar viral particles have been observed in turkey rhinotracheitis [8] and in fulminating disease of guinea fowl [4]. These could not be grown and were not antigenically compared; thus far, they remain unidentified.

The present data confirm the advantage, as already pointed out by McNulty and others [6], of systematic EM in aetiological research on avian diseases. Isolation and identification experiments on cellular systems are currently in progress to determine the viral nature of the particles observed.

KEY-WORDS: Fowl, Enteritis, Virosis; Aetiology, Electron microscopy.

RÉSUMÉ

PARTICULES VIRALES NON IDENTIFIÉES
ET PARAISSANT ASSOCIÉES À DES ENTÉRITES
OBSERVÉES CHEZ DIVERS OISEAUX DOMESTIQUES

La microscopie électronique nous a permis d'observer, chez des oiseaux domestiques présentant une entérite (pintades, canards, poulets, dindes), des images de particules virales enveloppées et spiculées dont l'aspect est identique d'une espèce aviaire à l'autre et qui n'ont pas été, jusqu'à présent, identifiées.

MOTS-CLÉS: Volaille, Entérite, Virose; Etiologie, Microscopie électronique.

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