



Evaluation of Astrovirus transmission in a Piedmont hatchery

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INTRODUCTION

Runting-stunting syndrome (RSS) is an enteric disease that causes significant economic losses to poultry producers worldwide. A wide variety of RNA and DNA viruses have been identified as agent of RSS. One of the most abundant viral family identified in RSS is the *Astroviridae* (Devaney et al., 2016, Smyth et al., 2017). Recently, chicken astrovirus strain (CAstV) has been associated with a hatchery diseases, whose symptoms and lesions resemble the ones of RSS in kidneys and liver. The disease leads to runting/poor development, weakness, and abnormal feathering. Moreover, an increase in mid to late embryo deaths and reduction in hatchability was reported (Smyth et al., 2013, Sajewicz-Krukowsk et al., 2016). Accordingly, a vertical transmission as been hypothesized.

RESULTS and DISCUSSION

At present, 100 paper and 114 sera and some environmental samples were tested by real time PCR and by ELISA.

All the hatchery environmental samples were negative for CAstV.

The excretion results in chicks (mean copy numbers of CAstV) did not show significant differences, based on the type of layer farming or on nest/ground collected egg (ANOVA, $p=0.2$; Table 1). However, a significant difference was observed based on the egg breeding origin ($p=0.04$) (Table 2).

These preliminary data indicate that high copy numbers of CAstV are not associated to the breeding type, but to the infection of the breeders. Moreover, the amount of virus directly correlate to amount of CAstV antibody present in the breeders but not to the breeding type and to the hygienic status of eggs.

Layer farming type	Ct value (mean \pm standard deviation)
Cages	27.3 \pm 9.9
Nests	25.9 \pm 7.6
Ground	17.7 \pm 2.5

Table 1. Mean Ct value obtained in real time PCR targeting CAstV in chicks from different layer farming types

Layer farms	Ct value (mean \pm standard deviation)
A	17.2 \pm 1.8
B	27.3 \pm 9.9
C	26.4 \pm 5.4

Table 2. Mean Ct value obtained in real time PCR targeting CAstV in chicks from different origin (farms)



Fig. 1. Aglietto natura srl hatchery and chicks variability



The aim of this study was to evaluate the CAstV excretion in newborn chicks from a hatchery in Piedmont region, north western Italy, where RSS problems were present in chicks. Specifically, we focused our attention on a hatchery which is specialized in backyard poultry production since 1956 and characterized by high quality industrial production (organic production, cockerels, slow growing chickens) (Fig. 1).



Fig. 2. 1 day chicks box

MATERIALS AND METHODS

Hatchery environmental samples were collected to evaluate environmental contamination.

The paper used in chicks transport boxes (fig. 2) was collected from two types of layer poultry farming: cage and cage free layer. In this last farms, we considered the chicks derived from egg collected from nests and from the ground. The paper and some environmental samples were tested by real time PCR (kit KYLT, AniCon Labor GmbH, Germany) for the detection of group A and B Chicken Astrovirus. Moreover, the serological status of the breeders was evaluated by the application of an indirect ELISA test (external service).

We used the ANOVA test to evaluate differences in PCR Ct values among groups (origin of the samples).

CONCLUSIONS

The CAstV is a newly emergent virus that has been associated to a poor growth of poultry flocks, diarrhoea and enteritis and it is the principal candidate pathogen in the RSS. It is more resistant to disinfection and cleaning than other viruses. Indeed, it is transmitted horizontally by the faecal-oral route and some strains can also be vertical transmitted from naive in-lay parent bird, thus chicks may hatch shedding high levels of this virus.

Our data consolidate the hypothesis of CAstV vertical transmission and exclude hatchery as a source of CAstV infection. However further analyses are necessary to better clarify the role of hatcheries in the epidemiological cycle of CAstV.