# Goose haemorrhagic polyomavirus infection in ducks

SIR, – Haemorrhagic nephritis and enteritis of geese (HNEG) is one of the major viral diseases of geese, affecting birds aged four to 10 weeks, with high morbidity and mortality. Under field conditions, death is the most common outcome, generally preceded by coma (Guerin and others 2000). The postmortem findings are oedema of subcutaneous tissues, gelatinous ascites, inflammation of the kidneys, and often haemorrhagic enteritis (Lacroux and others 2004).

HNEG was first reported in 1969 in Hungary and was subsequently recognised in Germany and France. The agent of HNEG was identified as a novel polyomavirus (goose haemorrhagic polyomavirus [GHPV]) 30 years after the first clinical report (Guerin and others 2000). Other waterfowl species, such as mule (hybrid) or Muscovy (*Cairina moschata*) ducklings, were considered clinically refractory to GHPV inoculation.

Muscovy and mule ducklings being examined for increased mortality, growth and feathering problems were screened for immunosuppressive viruses: duck enteritis virus, duck and goose parvoviruses, duck circoviruses and also GHPV. Samples (spleens) from clinical cases were submitted to the analysis department of the Scanelis Laboratory (France) in order to perform real-time PCR-based diagnostic analysis (Table 1).

Surprisingly, some mule or Muscovy ducklings were PCR-positive for GHPV, and furthermore, GHPV viral loads could be as high as those observed in goose clinical cases (data not shown). GHPV-positive ducklings were mostly also positive for other viruses, especially circoviruses.

The full sequence of the GHPV VP1 gene was determined for eight duck isolates (six Muscovy and two mule), and for one goose isolate (data not shown). All nine isolates shared almost 100 per cent identity with 'classical' GHPV isolates already described.

The complete characterisation of duck GHPV isolates is currently underway, through a full sequence analysis of their genome, propagation assays in cell culture and cross-inoculations of goslings. This will be critical to assess whether ducks could act as an epidemiological reservoir of GHPV for goslings, since these waterfowl species may be brooded together.

The pathobiology of GHPV is based on its tropism for endothelial and lymphoid cells, and, more generally, avian polyomaviruses are associated with inflammatory diseases (Lacroux and others 2004, Johne and Muller 2007). The pathological significance of GHPV infection in ducks should therefore be further investigated in the field, in order to determine whether this avian polyomavirus should be considered as a novel immunodepressive virus of ducks, along with parvoviruses and circoviruses.

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**TABLE 1: Viruses detected in the spleen of Muscovy or mule ducklings***

| Case | Species | Age (weeks) | PCR status | | | | |
|---|---|---|---|---|---|---|---|
| | | | GPV | DPV | DCV | DEV | GHPV |
| 1 | Muscovy | 8 | – | – | + | – | + |
| 2 | Muscovy | 11 | – | + | – | – | + |
| 3 | Muscovy | 3 | – | + | – | – | – |
| 4 | Muscovy | 7 | – | – | + | – | – |
| 5 | Muscovy | 12 | – | – | + | – | + |
| 6 | Mule | 4 | + | – | + | – | + |
| 7 | Mule | 3 | – | – | + | – | + |
| 8 | Mule | 3 | + | – | + | – | – |
| 9 | Mule | 7 | + | – | + | – | – |
| 10 | Mule | 2 | – | – | – | – | – |

* Ducklings were included in this screening on the basis of increased mortality, poor feathering and growth performance
GPV Goose parvovirus, DPV Duck parvovirus, DCV Duck circovirus, DEV Duck enteritis virus, GHPV Goose haemorrhagic polyomavirus