Monitoring ANIMAL HEALTH

Poultry | July 2022

Fowlpox throughout the year

The avian pox viruses cause nodular lesions on the unfeathered skin areas and on the feather follicles of various species of birds. Fowlpox was found in 280 different species of birds, including poultry.

Dry pox
This most commonly occurring form is characterised by a proliferative thickening of the epidermis (see photos 1 and 2). The locations of these pox lesions are linked to the vector transmitting the disease: stinging insects.

Wet pox
Inhalation or oral ingestion of virus containing water droplets can result in necrotic proliferative lesion of the mucosa in the beak, oesophagus and the larynx, and the trachea (diphtheritic form or wet pox).

Spreading and diagnosis
Under optimum conditions, the virus can remain infectious (outside the chicken) for many years. It is a slowly spreading disease with an incubation period of up to 10 days. The morbidity (clinical signs) can be as high as 95 percent. The diphtheritic form of pox in particular can result in great losses, of up to 25 percent. The cutaneous form (dry pox) leads to fewer losses, but the presence of the pox, for example around the beak and on the eyes, can result in lower water and feed intake and therefore to lower production. With histological examination, the diagnosis of fowlpox can be made by detecting the intracytoplasmic inclusion bodies in the affected cells. This disease mainly occurs in countries with a hot and humid climate.

Photos 1 and 2. Dry pox

Fowlpox virus can spread within an infected flock through direct contact between an infected animal and a susceptible animal, or by inhalation or ingestion of infected dust and/or infected water droplets. The virus cannot penetrate intact skin. Between flocks, the most important transmission route is by stinging insects. In regions with a moderate climate, fowlpox is no longer a big problem due to preventative vaccination. In (sub)tropical regions, fowlpox is still a problem, particularly because it is very difficult to control stinging insects. The most commonly occurring stinging insects associated with the spread of pox are mosquitoes (*Culex* and *Aedes* species). A mosquito that has fed on an infected chicken can carry the virus in its saliva glands for a period of up to 8 weeks, and therefore transmit it when feeding on a susceptible chicken. Avianpox viruses are not zoonotic.

Vaccination
Various fowlpox vaccines have been developed over the years. Most of the vaccines are attenuated field strains (fowlpox and pigeonpox). These are cultivated in chicken embryos or cell lines and must be administered percutaneously (through the skin), such as via the wing web method, from the point in time that the maternal immunity has declined sufficiently. In recent years, poxvirus based vector vaccines have also become available. There is great heterogeneity within the group of pox viruses. It is unclear whether all antigen pox virus variants are covered by the applied vaccines.

Outbreaks
There have been occasional outbreaks of fowlpox in the Netherlands in recent years and particularly during the last quarter of the year. From 2021 on, we are not only seeing cases in autumn and early winter, but also outbreaks during the first quarter of the year. This is concurrent with (minor) peaks in the occurrence of biting mosquitoes in January and February (according to the mosquito radar). It is striking that there are no notifications of outbreaks during the mosquito peaks in summer months.

Unusual clinical conditions: O.r. in combination with sepsis

In late 2018 and the second quarter of 2020, unusual clinical conditions were detected upon necropsy of animals from three broiler farms. This concerned sepsis (blood poisoning) caused by infection with the *Ornithobacterium rhinotracheale* (O.r.) bacterium. This bacterium is particularly known for causing abnormalities in the air sacs and lungs, whereby residual lesions are detected upon slaughter, as well as being a commonly named cause of rejections on the slaughter line. There are however descriptions of the bacterium occasionally causing infection in other organs. The clinical condition of sepsis as found in these cases is not described in the literature. The clinical condition of sepsis has been detected multiple times at the farms in question (in several flocks).

In April 2022, GD once again detected O.r. in combination with sepsis at two of the aforementioned farms.

Using specific staining techniques, it is possible to colour the O.r. bacteria in organ tissues, for examination through a microscope. Photos of the tissues from sepsis cases (see photos 3 and 4) show that the bacteria are present in the blood vessels rather than simply on the surface of the air sacs, where they are generally detected during an O.r. infection.

Genetic examination (see figure 1)
A further study has been made of the detected strains of O.r. bacteria. Genetic analysis compared the sepsis O.r. strains (see red symbols in figure 1) with one another and

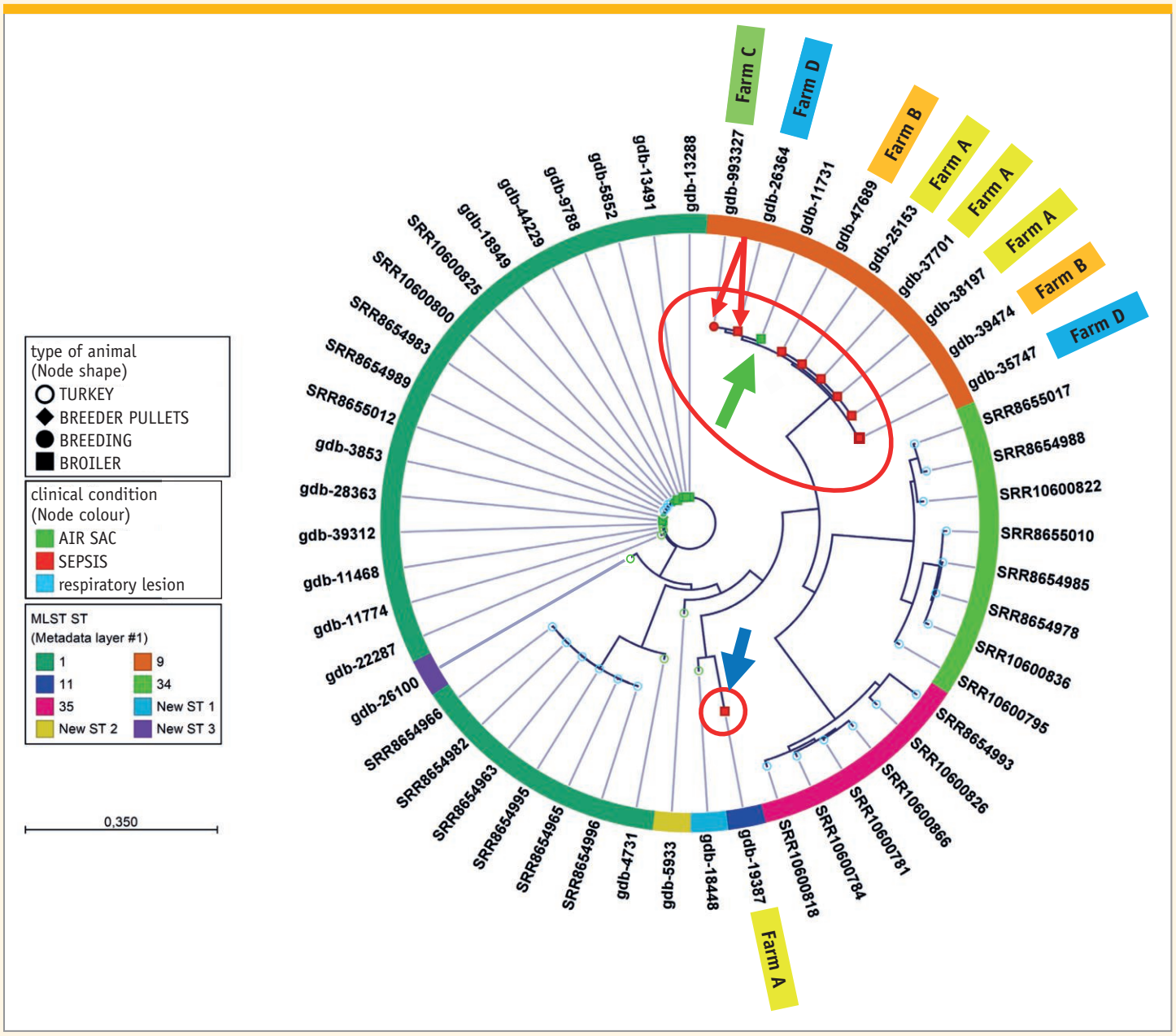


Figure 1. Results of genetic study of sepsis O.r. strains and O.r. strains from animals presenting with respiratory problems (a coded representation is given of the strains)

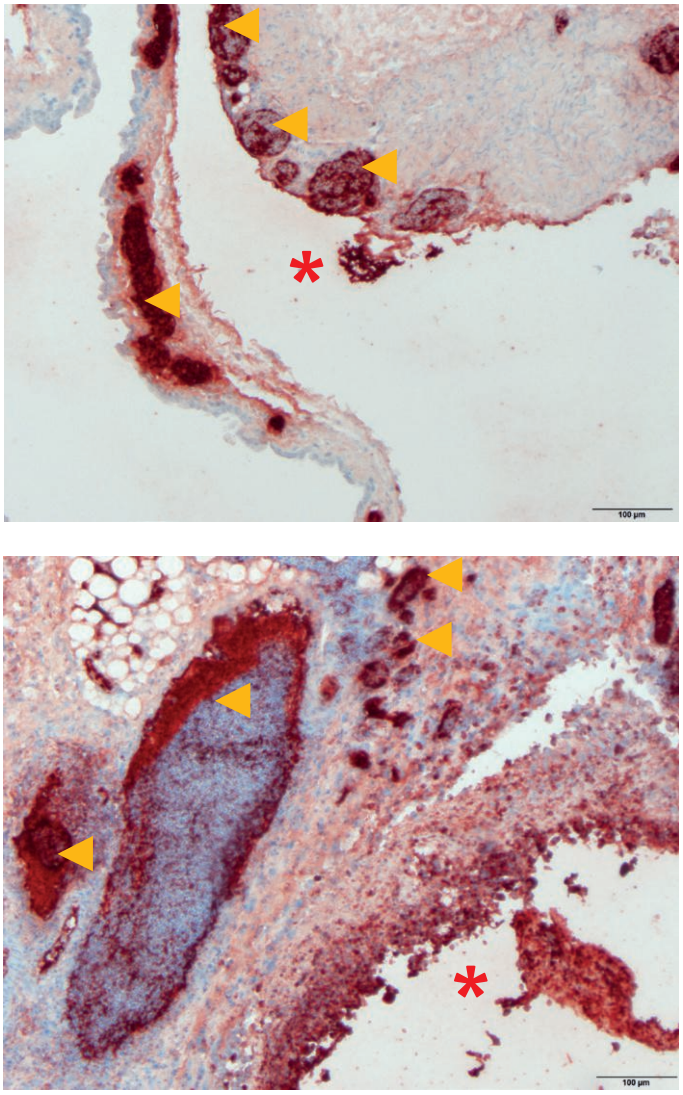
Royal GD
P.O. Box 9, 7400 AA Deventer
The Netherlands

T. +31 (0)88 20 25 575
support@gdanimalhealth.com
www.gdanimalhealth.com

with strains previously isolated from air sac infections (green symbols). The genetic examination of the O.r. strains showed that the strains isolated from the sepsis clinical condition displayed great genetic similarities (with the exception of two strains; red arrows). Only one strain was isolated from air sac abnormalities, which belonged to the same cluster (green arrow). The strains from one and the same farm (isolated at various points in time) show great genetic similarities (with one exception; see blue arrow). Based on the genetic information, the strains of the sepsis cases would seem to be related.

Further research

There is currently insufficient insight into the O.r. strains circulating in the Netherlands to allow an estimate of whether these related strains have a different pathogenic capacity, or whether the unusual clinical signs can be attributed to other causes such as reduced effectiveness of the immune system of the animals, caused by another infection. In collaboration with VMP and the veterinary practical oriented research, more recent O.r. strains are being collected in order to conduct genetic testing. An in-depth study is also underway to determine whether for instance specific genes are found in the strains detected in the sepsis cases, versus the classic O.r. cases.



Photos 3 and 4: air sacs of a chicken with sepsis due to O.r. The O.r. bacteria can be seen as red dots, and they can be seen in large numbers here on the surface of the air sac (*) and in cross-sections of blood vessels (◂).

Monitoring ANIMAL HEALTH

Animal health monitoring

Since 2002, Royal GD has been responsible for animal health monitoring in the Netherlands, in close collaboration with the veterinary sectors, the business community, the Ministry of Agriculture, Nature and Food Quality, vets and farmers. The information used for the surveillance programme is gathered in various ways, whereby the initiative comes in part from vets and farmers, and partly from Royal GD. This information is fully interpreted to achieve the objectives of the surveillance programme – rapid identification of health issues on the one hand and monitoring trends and developments on the other. Together, we team up for animal health, in the interests of animals, their owners and society at large.

GD2641/07-22