Bulgaria stops the spread of animal disease with the help of the IAEA and FAO

By Laura Gil

Bulgarian authorities at a local farm carrying out their disease control work.
(Photo: S. Slavchev/IAEA)

In 2018, Bulgaria halted the spread of *peste des petits ruminants* (PPR) — a disease that can devastate livestock — thanks in part to the support of the IAEA and the Food and Agriculture Organization of the United Nations (FAO). This was the first time PPR had been recorded in the European Union, which made halting its spread early an important goal for the region.

Summer outbreak

In the summer of 2018, cattle breeders on the farms of Voden in south-eastern Bulgaria noticed that their animals were suffering from a disease. Soon after, authorities reported that the country was facing an outbreak of PPR. Within days, two Bulgarian scientists came to the IAEA to receive training and materials to rapidly detect and characterize the PPR virus using nuclear-derived techniques. The area underwent active surveillance, and no more cases have been reported since July 2018.

Although not transmittable to humans, PPR can have a severe impact on livestock, killing between 50 and 80% of infected animals, mostly sheep and goats. Its high economic impact makes PPR one of the most significant livestock diseases. Also known as ovine rinderpest or sheep and goat plague, PPR originated in Africa but has also been reported in Asia and the Middle East.

"Most European laboratories are generally neither familiar with nor prepared to deal with this disease," said Giovanni Cattoli, Head of the Animal Production and Health Laboratory at the Joint FAO/IAEA Division of Nuclear Techniques for Food and Agriculture. "It is exotic, off their radar. But, luckily, Bulgaria reacted quickly, and we stepped up to support them."

The European Union Reference Laboratory for *peste de petits ruminants*, based in

Montpellier, France, later confirmed their findings.

Immediately after the outbreak was confirmed, Bulgarian authorities imposed a quarantine zone around the village of Voden in order to contain the disease. Additionally, they ordered blood tests on small livestock and banned the trade and transport of all livestock in the regions along the Turkish border, the area of the country affected by the disease.

As a consequence of the emergence of the disease, animal movement restrictions and trade barriers were put in place to limit the spread of the infection and facilitate the eradication of the disease. This is standard procedure in the European Union. Bulgarian authorities also implemented active surveillance in the area to remove any potentially infected animals from herds. "We have a lot of confidence in Bulgaria's capacity to control the disease, but work should continue," Cattoli said. "The same way it reached Bulgaria, it could reach other European countries."

Six months after the last case occurred, active surveillance indicated that the virus was no longer circulating in the country — a pre-requisite to lifting the ban.

Eradication?

After the eradication of rinderpest, the 'older sister' disease of PPR that affects bigger livestock such as cows, was declared in 2011, the FAO and the World Organisation for Animal Health (OIE) set a goal for the global eradication of PPR by 2030. Achieving this could have a major positive impact on affected economies and communities. For example, the eradication of rinderpest in 2011 in Africa alone led to an annual estimated economic benefit of US $920 million for the region, according to FAO estimates.

"If you look at the virus and the epidemiology of the disease, technically this is achievable," Cattoli said, referring to the eradication of PPR. "The difference is that there are far more goats and sheep whose location and movements are sometimes difficult to trace, so having exact figures and calculating the right doses for a vaccine programme can be a challenge."

In partnership with the FAO, the IAEA assists national experts in developing and adopting nuclear-based technologies to optimize animal health management practices. These techniques, such as enzyme-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR), are extremely precise (see The Science box).

THE SCIENCE

Enzyme-linked immunosorbent assay & polymerase chain reaction

Enzyme-linked immunosorbent assay (ELISA) and **polymerase chain reaction (PCR)** are two nuclear-derived techniques commonly used for disease diagnosis.

ELISA is easy to set up and use, which makes it suitable for any veterinary laboratory. Scientists place a diluted serum sample from an animal onto a prepared dish and, if the sample contains the suspected disease, it causes an enzyme in the fluid to change the liquid's colours, confirming the presence of the disease. ELISA is often used for initial tests and for screening large populations, but it cannot be used to precisely identify virus strains.

See page 8 for more information on PCR.