

Epidemiological approaches to control animal infectious diseases

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Abstract

In livestock production, herd inventory has been increasing and outbreaks of infectious diseases cause great economic damage. Epidemiological approaches to control animal infectious diseases such as identifying spatiotemporal transmission dynamics and risk factors, and establishing preventive and control measures have not been well established, and it is urgent to establish an objective epidemiological approach using big data that can be collected from the livestock production. My research has focused on development of epidemiological approaches to control animal infectious diseases, targeting porcine epidemic diarrhea (PED), bovine respiratory disease complex (BRDC), and *Theileria orientalis* Infection.

PED is an emerging disease that has led to large numbers of piglet deaths in a number of countries. Authors assessed the spatial dynamics of PED spread in the southern Kyushu, and found highly significant spatial and spatio-temporal clustering of cases¹. Next, multivariate logistic regression analysis was conducted to identify risk factors associated with PED infection, and revealed that the distance to the PED-affected farm and the number of visits by feed trucks were major infection risk factors, and that sufficient disinfection time was important to reduce risk. Also, the impact of PED occurrence on reproductive performance and profitability was quantified. Finally, a biosecurity assessment tool to assess biosecurity levels was developed.

BRDC is the most common and costly disease in beef cattle. Authors assessed whether any associations relating to the calf information on arrival at the backgrounding operation and BRDC incidence in Japanese Black calves exist, and various factors on arrival at the backgrounding operation were found to be associated with BRDC incidence². Next, economic loss due to treatment of BRDC in Japanese Black calves arriving at a backgrounding operation was investigated, and revealed that BRDC has one of the highest economic impacts in modern beef cattle production. In addition, early detection system of Japanese Black calves with fever using the ventral tail base surface temperature was developed.

Theileria orientalis is a tick-borne protozoan parasite that causes mild to severe anemia in infected cattle. Authors investigated the prevalence of *Theileria orientalis* infection and the influence of this disease on dairy grazing heifers in Kyushu by monitoring red blood cell indexes³. Additionally, the effect of *Theileria orientalis* infection on the productivity was assessed. Then, authors revealed that it is possible to establish a *Theileria orientalis*-free grazing system by conducting appropriate measures.

References

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