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Porcine Respiratory Disease Complex (PRDC) and Mycoplasmosis

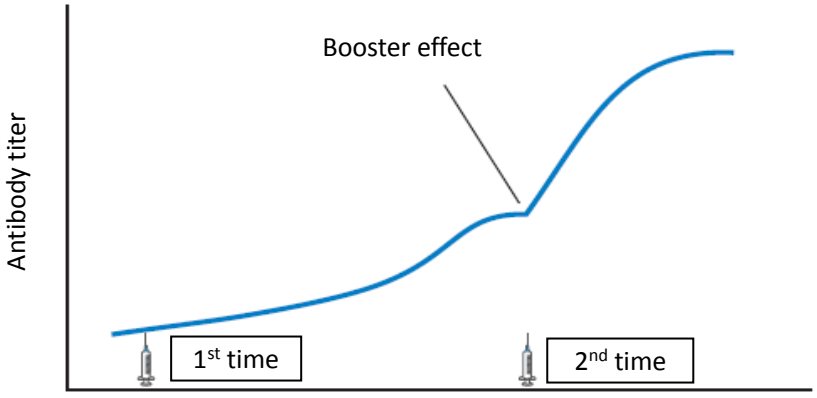
Similar to cows, pigs have small lung volume relative to their body volume. As a result, a great burden is placed on their lungs. Therefore, pigs are prone to suffer from respiratory disease. In addition, factors such as pigpen environment, rearing density, climatic conditions (high temperature and high humidity in summer and low temperature and low humidity in winter), and stress are complexly involved in the onset of respiratory disease. In some cases, one type of pathogen causes respiratory disease. In many cases, however, mixed infection of multiple types of pathogens causes respiratory disease. Therefore, such respiratory disease is called Porcine Respiratory Disease Complex (PRDC). Complex means mixed infection.

There are many types of pathogens that cause PRDC including PRRS virus, Aujeszky's disease virus, circovirus, pleuropneumonia bacterium, mycoplasma, pasteurella, influenza virus, Glasser's disease bacterium, AR-causing bacterium, and streptococcus. For most pathogens which cause PRDC, vaccines have been developed. Vaccines consist of live vaccines and inactivated vaccines. Live vaccines are live bacteria or viruses with attenuated toxicity. When they are injected into the body, bacteria or viruses will proliferate, and antibodies will be produced. Inactivated vaccines, on the other hand, are vaccines without toxicity, which are produced by destroying bacteria or viruses and extracting components necessary to establish immunity.

What we would like to mention here again is the term "booster effect". It means that when the immunologic mechanism which was established once in the body contacts antigens again, a higher immunologic effect can be expected, that is an increase in antibodies is observed (See the schematic diagram). Although booster effect can be expected for both live vaccines and inactivated vaccines, booster effect is useful especially for inactivated vaccines by which bacteria or viruses do not proliferate in the body. Two-time injection is ideal because inactivated vaccines usually contain adjuvants, a substance which enhances immune response, although some live vaccines contain. There are inactivated vaccines for one-time injection with ingenuity in terms of adjuvants, etc. However, the results of many studies show that two-time injection is more effective.

Here, we would like to examine the current status of vaccines against mycoplasma, which is considered to be one of the primary pathogens of PRDC. Its injection rate is 60% and most of the injections are one-time injections. Formerly, it was two-time injection, but from the viewpoint of ingenuity and working efficiency in vaccine manufacture, one-time injection has become the mainstream. However, it is obvious that even if the same type of vaccine is used, two-time injection will exert a more favorable effect. In general, seroconversion is considered to occur at 90 to 120 days old, regardless of the presence or absence of vaccine injection.

When performing one-time injection of mycoplasma vaccine, activity of mycoplasma during the fattening period is of a great concern. Mycoplasma infection itself is a problem but so is an introduction of other pathogens. Because mycoplasma does not have cell wall and exists in very flexible forms, it completely fills in between tracheal cilia. Therefore, infection of pleuropneumonia organism and other pathogens occurs easily. Reinjection of mycoplasma vaccine at 60 to 90 days old will suppress mycoplasma itself and prevent invasion of other pathogens. Except for extremely large mycoplasma lesions, lesions are formed by accumulations of cells such as lymphocytes. If immunity to mycoplasma is cell-mediated immunity, these findings may indicate immune response. Although it is necessary to confirm the presence or absence of pulmonary lesions for the evaluation of the effect of vaccines and medicines, growth performance may be more useful than the rate of lung lesion area.



Schematic diagram. Booster effect of vaccines

Here is an example of a farm in which the second mycoplasma vaccine was injected before the fattening period. This farm is a farrow-to-finish farm in Shikoku with 320 mother pigs. Mycoplasma vaccine for one-time injection was injected at 3 weeks old, and Swine AP Vaccine 125RX (Nisseiken) was injected at 50 days old and 80 days old. The test results of samples taken in October 2014 are shown in Figure 1. The ELISA value of Mhp at 120 to 150 days old was not low, within the range of 0.6 to 0.9 (positive: 0.3 or above), and the accident rate was not low, either.

Therefore, for the purpose of decreasing Mhp infection during the fattening period and improving the accident rate and the number of shipping days, the second vaccine was changed from 125RX Vaccine to Swine APM Inactivated Vaccine (Nisseiken).

The test results of samples taken in May 2015 are shown in Figure 2. The ELISA value of Mhp at 120 to 150 days old was not high at 0.3 or below. Although the test was conducted under harsh conditions through winter, the accident rate was decreased, and the number of shipping days was improved as well.

As mentioned above, one-time injection is the mainstream of mycoplasma vaccine. However, considering the fact that two-time injection is ideal for inactivated vaccines, in farms where AP Vaccine is injected, the second mycoplasma vaccine can be injected without trouble if APM Vaccine is used. We consider that it is very meaningful to suppress mycoplasma infection and other microbial infections during the fattening period.

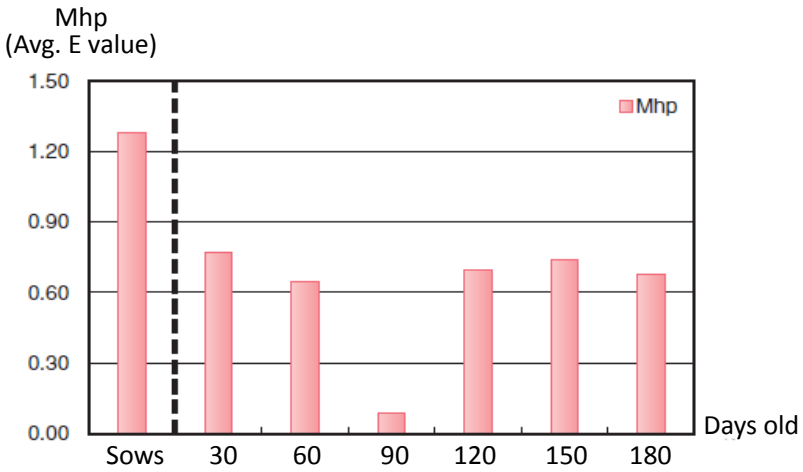


Figure 1 Mycoplasma pneumoniae (Mhp) antibody (ELISA) Sampled in Oct. 2014

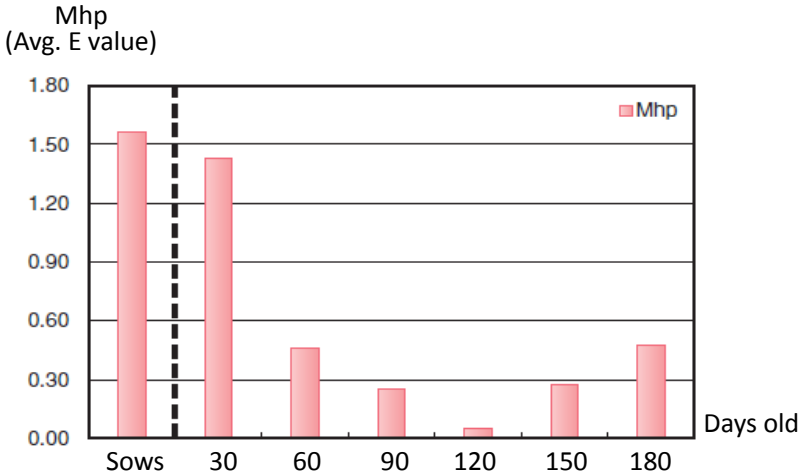


Figure 2 Mycoplasma pneumoniae (Mhp) antibody (ELISA) Sampled in May 2014