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Experiences with Erysipelas vaccine

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Introduction

In today's swine industry, where profits depend on acceptable levels of output, producers need to maximize reproduction efficiency so they can remain financially sound. Diseases that affect the breeding herd are significant, this is both due to loses of the developing litter and due to the wider impact on farm productivity and economics. These diseases can be classified into those which have a specific reproductive effect (e.g., Erysipelas, Porcine Parvovirus, PRRSv, Leptospira, Pseudorabies, etc.) and those which are non-specific or systemic (e.g., Swine influenza, enzootic pneumonia, sunburn, sunstroke, etc.)(1, 2). The effects of the disease on the sow depends on the following:

- The agent involved
- The degree of immunity or resistance to the insult
- The stage of pregnancy at which the disease occurs

Chronic stressors (e.g., heat, fighting, gases, etc.) release corticosteroids which have suppressive effects on cell-mediated immunity. Animals exposed to hostile environmental or social conditions can become vulnerable to disease even though a reliable preventive program (e.g., vaccination) has been instituted. Therefore, any investigation of an outbreak should include the following:

- Developing a clinical history of the herd
- Performing a clinical examination of the herd
- Examining reproductive records carefully
- Assessing the details of management practices
- Differentiating and confirming the disease via laboratory diagnostics

Erysipelas was first described in 1878, and *Erysipelothrix rhusopathiae* was isolated in 1885 from a pig in the United States. *E. rhusopathiae* is a gram positive, facultative anaerobic, rod found worldwide that can cause disease in many species, including pigs, sheep, birds, reptiles, fish, and humans (3). Classic clinical signs such as pyrexia, lethargy, inappetence, abortion, death, and possibly rhomboid urticarial (i.e., diamond skin) lesions are easily recognized and mostly treated on-site without the aid of a diagnostic laboratory (4).

Swine are susceptible to 15 out of the 28 described serotypes. Erysipelas has four types of presentation: subclinical, acute, subacute, and chronic. Serotypes 1 and 1a are most common in acute Erysipelas, whereas serotype 2 is most prevalent in the chronic form (5). In recent years cases of swine erysipelas seem to be on the increase, not only in the United States, but also in other countries of the world. Concerns about genetic change, and/or serotype variation (4) or reduction of the efficacy of the attenuated Erysipelas vaccine due to PRRSv (6) have been raised due to recent outbreaks both in breeding herds and in growing pigs. Nevertheless, there is no evidence of the above, but there is general agreement that the swine industry has undergone important changes both in production systems and management techniques that have, in some instances, eliminated Erysipelas vaccination programs. These, along with short duration of immunity, may be the contributing factors to the increase in the number of Erysipelas cases.

Clinical case study

Farm description

The unit is a 1500-sow farrow-to-finish farm located in the Northwestern part of Mexico where average temperatures range 50-65°F from November to February and 70-110°F from March to October. The farm is part of a vertically integrated group of producers (40,000 sows) that have their own nucleus farm (375 sows), AI center (250 boars), feed mill, and slaughter plant. The system exports 40% of their production to Japan.

This farm has its own internal multiplier (150 sows) for the production of their own replacement gilts. Due to a decrease in production caused by a PRRSv re-break during 2000 and 2001, the farm imported almost 800 gilts from a very high health status breeding stock company in Canada to ensure adequate replacement. Replacement rate during 2000 and 2001 has been over 70%, in order to improve the genetic composition of the herd and to secure high production.

Gilt acclimation

The quarantine facility is located 30 miles away from the farm. We follow a mixed quarantine and acclimation program to guarantee the best possible immune status of the incoming replacement. First, negative animals are inoculated with PRRSv-positive serum from viremic pigs from the nursery. These gilts experience an 8-10 week "cooling" period, and then they are incorporated into the farm replacement gilt pool. At this time all the replacement animals are vaccinated according to the schedule shown in **Table 1**.

Health status

The farm is positive to PRRSv, *Mycoplasma hyopneumoniae, Actinobacillus pleuroneumoniae* and *Salmonella cholerasuis*. Sows are vaccinated against *Mycoplasma* and Parvovirus-Leptospira-Erysipelas five and three weeks prior to farrowing, respectively.

Erysipelas outbreak

During the months of January and February, the farm experienced a 5 and 2% increase in mortality and abortion rate, respectively, in the breeding herd. During these two months, mortality reasons where classified as 50% *Clostridium novyi,* 30% musculoskeletal, and 20% unknown. Abortions where catalogued as 2nd or 3rd term, non-parity specific. Sows where anorexic and developed a very high fever, but after treatment either with penicillin or oxytetracycline, showed improvement and cycled three to five days after the abortion. At this time the "diamond" skin lesions where not reported either on the dead or aborted sows.

On a visit to the farm during March of 2001, 20-30 animals with classical rhomboid lesions on the flanks, abdomen, and extremities were detected. The affected animals were inappetent, presented a high fever over 40°C (104°F), and several aborted in the days after the visit. During inspection of the culling pens, 60% of the animals exhibited arthritis, either on the hock, elbow, or carpal joints. Two necropsies where performed; the relevant findings included the following:

Sow 1

- Rhomboid lesions on the flanks
- Liver congestion
- Enlarged liver
- Enlarged lymph nodes

Sow 2

- Vegetative endocarditis
- Lung edema
- Infarcts in kidney and spleen

Actions taken

Examination of practices

- Gilt management
- Vaccination program for gilts (**Table 1**) and sows (three weeks prior to farrowing)
- Vaccine management from the veterinary supply office to the farm (temperature during transportation)
- Vaccine management at the farm (refrigerator temperature, needles used, temperature of the vaccine during the vaccination procedure, etc.)
- Vaccine purchases vs. programmed doses/inventories

After a thorough investigation, we discovered that the gilt vaccination program had been altered and that gilts where being vaccinated only at around 170 days of age.

Revaccination of the whole herd

In light of the above finding, we decided to re-vaccinate the whole herd with a monovalent Erysipelas bacterin. To ensure high levels of protection, a second dose of the vaccine was administered two weeks after the first revaccination was performed.

Feed medication

A one-time high dose (1000 ppm of oxytetracycline) was offered in the gestation and lactation ration for two weeks.

Individual treatment

Individual treatment was given to all animals showing classical clinical signs and to sows in adjacent crates. All these animals where treated with 50,000 IU/kg of long-acting penicillin for five days.

Conclusions

We made the following conclusions:

- Due to the high replacement rate, the immunity of the herd was compromised.

Table 1: Erysipelas vaccination program for gilts.

Vaccine	Age (days)
Actinobacillus pleuroneumoniae	150 and 165
Mycoplasma hyopneumoniae	157 and 172
Parvovirus, Erysipelas, and Leptospira	164 and 180

- The omission in the gilt vaccination program impeded the adequate development of acquired immunity, thus increasing the naïve population.
- Aside from the Parvo-Lepto-Erisipela vaccination program, the whole herd should receive two shots of Erysipelas vaccine, one in March and one in October; these are the months where temperature varies more than 20°C from day to night.
- There was a heat wave in March, with temperatures ranging from 25-35°C; this might have acted as the triggering stressor for the outbreak.
- Supervision of recommended management practices requires a more robust system in order to avoid omissions that are costly to the farm.

Questions to be answered

- Was this outbreak due to a different strain from the one prevalent in the farm?
- Was the attenuated vaccine a better option?
- Do we need to reduce the timing between vaccinations (i.e., every four months instead of every six)?
- Is there a PRRSv-Erysipelas interaction that has not yet been scientifically proven, but is present in the field?

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