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USING INGELVAC®M HYO TO CONTROL MYCOPLASMAL PNEUMONIA IN A THREE SITE SYSTEM

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Mycoplasma pneumonia has gained attention in the last 10 years as the incidence and severity of the disease has mounted. Changes in the organism itself, alterations in pig flow methods, such as multi-site production[1], increased population density and confounding pathogens (i.e. PRRS), or all the above have been suggested as contributing factors. Vaccination against *M hyopneumoniae* (*M hyo*) is one successful method to control its biologic and economic impact.

Ingelvac®M hyo One Dose is a unique, first of its kind bacterin against *M hyo*. Impran™ biodegradable oil adjuvant is a key component of the product. Additionally, emulsification allows for increased exposure of antigens to the immune system. Finally, enhanced antigen levels complement Impran™ adjuvant to allow for sustained exposure to the immunizing dose.

Duration of protection of >17 weeks has been demonstrated in challenge studies[2]. Utilizing a high-level challenge dose of 2 x 10^6 cfu (ISU Strain 11), delivered intra-tracheally, researchers demonstrated the long lasting performance of Ingelvac®M hyo One Dose. Several field investigations produced gains of 3 to 4 kg over non-vaccinated pigs (with the same days on feed)[3]. These results are consistent with results from a large study utilizing a market leading two-dose product in both continuous production and all in/all all production systems[4].

Case Description
The production system in this paper is an isowean system, utilizing a multi-source, multi-locus three-site production system[1]. Pigs are weaned at a conventional, three-week age (average of 17 days). Multiple nursery sites accept commingled pigs from the sow farms. Nurseries flow all out nurseries, and are cleaned and sanitized prior to refilling. Groups are split out of nurseries to finishers barns based on finishing site size. Finishing sites are run by all in all out basis and are cleaned and sanitized prior to refilling.

The system is infected with PRRS virus, Swine Influenza virus, *Pasteurella multocida*, and *Mycoplasma hyopneumoniae* as primary respiratory pathogens.

In late 1998, clinical respiratory disease occurred in growing pigs in the finishing stage. Diagnosis revealed *M hyopneumoniae* to be a major factor in this disease. Vaccination with Ingelvac®M hyo One Dose was implemented in January 1999. A subset of groups was also vaccinated with a leading, two-dose *M hyo* bacterin as a temporal comparative group, beginning in March 1999.

Intervention Strategy
Pigs were vaccinated at or just prior to placement into the finishing barn with Ingelvac®M hyo or the first dose of the conventional product. A booster for the two-dose bacterin was given two to three weeks following the initial dose. The health procedures for each group were recorded into a spreadsheet to accurately retain health and performance information for each production group. A common lot ID allowed for linking of the two databases.

Production parameters of interest were monitored to evaluate the impact of vaccination. In early 2000, additional diagnostic measurement of pigs at slaughter was initiated as part of a Continuous Improvement project. Prior investigations have shown significant association of antibody prevalence or mean concentration at slaughter to the impact of *M hyo* infection on performance[5,6].

Baseline Performance
Prior to initiation of the vaccination program, performance levels were near industry averages for growth rate, mortality and feed conversion. Pigs were marketed after 133 days on feed at 54.7% lean on a "Fat-O-Meter" grading system (average midline backfat of 1.78 cm, loin depth 6.11 cm).

Closeouts for these data were generated from pig groups placed on feed from 8/3/98 to 1/8/99. Other data are summarized in Table #1 below.

Ingelvac®M hyo One Dose vs. Non Vaccinated Pigs

Detectable (statistically significant) improvements in all parameters evaluated were noted. These included Average Daily Gain (ADG), Feed Conversion Ratio (FCR), % cull & mortality (cull/mort.), % lean and days on feed.

Due to a lack of contemporary controls, analysis of the data using an Industrial Experiment format in the methods of Shewhart was used[7]. Other changes in variables that could confound the study were evaluated and found to be associated with little or no change in performance. These include nutritional formulation of the diets, use of other vaccines or medication programs, facility type and genetic make up of the herd.

All statistical comparisons between pre-vaccination groups and Ingelvac®M hyo treated groups were significantly different ($P \leq 0.03$). Process behavior charts revealed signals, confirming the statistical significance of the changes.

Ingelvac®M hyo One Dose vs. Two Dose Bacterin

A total of thirty-six groups of pigs were vaccinated with a conventional two-dose bacterin as a temporal comparison group. Groups were identified and matched by placement date, use of other vaccinations and feed medications. Student's T-test was used to determine if detectable differences existed between treatments.

Significant differences in growth rate were detected. Ingelvac®M hyo vaccinated pigs grew significantly faster than pigs receiving two doses of a market leading bacterin ($P=0.01$). The added weight at market was approximately 1.43 kg per head. No difference in lean, backfat or loin depth was detected in these pigs.

Table #1 – Batch level finishing results (Different superscripts indicate significant differences; P<0.05)

Parameter	N	ADG	FCR	% Cull/ Mort.	% Lean	Head days
Pre-Vacc.	160	689 g[a]	3.06[a]	6.38[a]	54.7[a]	133.4[a]
Ingelvac	188	730 g[b]	2.78[c]	4.15[c]	54.9[c]	126.9[c]
Two dose	36	717 g[c]	2.78[c]	3.43[c]	54.7[c]	127.2[c]

Conclusions

Several comments can be made regarding control of *Mycoplasma hyopnuemoniae* in this production system:

- Vaccination of pigs with Ingelvac®M hyo One Dose or a two-dose bacterin produced statistically and economically significant changes in performance vs. non-vaccinated pigs.
- Ingelvac®Mhyo performed better than ($P=0.01$; ADG) or equal to ($P>0.05$; other parameters) a market leading two-dose bacterin.
- Process improvement methods, including health measurement systems, may provide information useful in deciding how to apply & evaluate health control changes, including use of management and vaccine techniques.

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