Mycoplasma: eradication by partial depopulation and strategic medication

Enzootic pneumonia is one of the most prevalent and economically significant infections in the swine industry. A farm-specific Mycoplasma hyopneumoniae (M. hyo) eradication programme without a stop in farrowing was implemented in a birth to weaning herd of 700 sows. The weaners (27 days old) were moved weekly to a compartmentalised nursery site and finally, at 11 weeks of age, transferred to all in/all out finishing barns.

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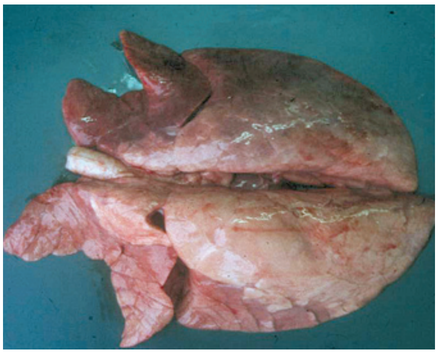
The nursery and the different fattening units were located at different sites. The diagnosis of enzootic pneumonia was based on clinical symptoms, several laboratory tests (ELISA serology, Polymerase Chain Reaction tests) and slaughterhouse findings. Treatment and control measures over longer time periods were not successful to manage the infection. Despite M. hyo vaccination of the piglets and frequent use of antibiotics, pigs originating from this breeding herd were still suffering from chronic coughing. Typically, vaccination did not stop mycoplasma colonisation and horizontal spreading among pigs.

Furthermore, M. hyo was the key trigger of the respiratory disease complicated by many other respiratory pathogens like Actinobacillus pleuropneumoniae. Both acute and chronic respiratory symptoms were responsible for major economic losses in the nurseries and fattening units.

The productivity was significantly decreased by impaired daily weight gain and feed conversion rate. A clear increase of the number of days to reach market weight and poor performing pigs was noted along with a higher mortality rate.

The farm management set the short term target to improve the general health status and technical performance by implementing a feasible eradication programme.



Typical pulmonary consolidation after M. hyopneumoniae infection.

Total depopulation of the breeding herd and repopulation with specific pathogen free pigs after thorough cleaning and disinfection of the whole farm would have created an enormous financial outlay and was not considered as a realistic option.

Table 1. Monitoring protocol after the finished treatment programme.

Time after the end of the medication programme (weeks)	Location	Age of the pigs (weeks)	Analysis	Number of samples	
				ELISA	PCR
14	Nurseries	11	Serology	25	–
			Oral fluids	–	3
			Nasal swabs	–	5
	Sow herd	Sows	Oral fluids	–	3
			Nasal swabs	–	5
		Gilts	Oral fluids	–	3
			Nasal swabs	–	5
23	Sow herd	Non-vaccinated gilts	Serology	20	–
	Nurseries	11		20	–
	Fattening unit 1	17	Serology	20	–
			Oral fluids	–	3
	Fattening unit 2	16	Serology	20	–
			Oral fluids	–	3
30	Sow herd	Non-vaccinated gilts	Serology	10	–
	Fattening unit 1	24		20	–
	Fattening unit 2	23		20	–
			Total	155	30

Partial depopulation and strategic medication

An eradication programme based on partial depopulation and strategic medication was initiated. This protocol requires only temporary changes in the pig flow. The cash flow disruption is less significant due to reduced production losses and the maintenance of the genetic potential and parity profile of the sows.

The distance to neighbouring herds was more than 3km, greatly reducing the risk of airborne re-infection. The programme was initiated in the summertime, which is the ideal season for eradication.

Higher temperatures reduce the survival time of the pathogen in the environment and increase the ventilation rates in the pens, both lowering the infection pressure.

The farm specific protocol required full commitment from the staff. Several actions were taken to improve internal and external biosecurity in order to avoid propagation of the infection inside the farm and re-introduction of the disease from outside.

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	Before	After	Difference
Pre-weaning mortality (%)	13.6	12.3	-1.30
Bodyweight at weaning (kg)	6.21	7.26	+1.05

Table 2. Technical data of the suckling piglets comparing the 16 weeks before and the first 16 weeks after the treatment.

	Before	After	Difference
Daily weight gain (g/day)	401	477	+76
Exit weight at 11 weeks (kg)	27.51	32.07	+4.56
Mortality (%)	3.98	2.22	-1.76

Table 3. Technical data of the piglets in the nurseries comparing the 16 weeks before and the first 16 weeks after the treatment (total of 9,589 and 8,171 nursery pigs respectively).

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Stringent cleaning and disinfection protocols were established. The protocol was based on the combination of strict biosecurity measures and a medication programme, both going hand in hand.

Stabilisation of the breeding herd

Pigs in excess of 10 months of age have normally built up high levels of immunity to mycoplasma, lung lesions have healed and shedding of the pathogen is low.

On the other hand, pigs younger than 10 months of age are often found to be highly infectious and shed M. hyo profusely.

All pigs younger than 10 months of age were removed from the sow herd in order to reduce active shedding and transmission of M. hyo.

Only animals older than 10 months and suckling piglets remained on site. Sick animals showing a lack of appetite were removed from the farm or euthanised before the start of the programme. In this multi-site production system, pigs were always removed from the breeding herd at weaning.

Hence, in this specific field case a stable sow herd was achieved by the temporary cessation of the purchase of gilts younger than 10 months.

The breeding herd was closed to the introduction of gilts and boars five weeks before the start of the medication period. All young animals (from weaning to 10 months of age) should be temporarily removed from the breeding herd for eradication in a one- or two-site herd.

Treatment of sows and piglets

After stabilisation, the remaining sows and gilts were treated via feed with tiamulin 100g/kg microgranulated premix (Vetmulin, Huvepharma) at a daily dose of 8-10mg tiamulin hydrogen fumarate/kg bodyweight for two consecutive weeks.

Successful eradication programmes have been conducted with tiamulin worldwide. Tiamulin belongs to the antimicrobial class of the pleuromutilins. The minimal inhibitory concentration of tiamulin to inhibit growth of 90% (MIC_{90}) of the M. hyo strains tested is not more than 0.06µg/ml.

This clearly indicates the highest susceptibility of M. hyo to tiamulin. Tiamulin does not only show excellent absorption after oral administration but also high tissue concentrations in the lung and broncho-alveolar fluid.

The exposure to tiamulin is 18 times higher in lung tissue compared to plasma. As the survival time of mycoplasma outside the pig's body is reported to be short, a treatment duration of 14 consecutive days was advised.

Special attention was paid to correct dosing, mainly for the sows in the lactation units. Sick sows refusing to eat during the treatment period were removed from the herd or injected with tiamulin.

The gilts introduced after the eradication programme were certified mycoplasma-free and were housed in a properly cleaned and disinfected quarantine area upon arrival.

From one week before until the end of the treatment period of the sows, the suckling piglets received a dose of tulathromycin (2.5mg/kg bodyweight, intramuscularly) every five days to avoid transmission in the farrowing units. Sick piglets were euthanised.

Only pigs originating from sows that were treated for the full 14 days prior to giving birth were considered to be M. hyo-free and were no longer vaccinated against M. hyo.

These mycoplasma-free pigs were transferred to completely depopulated facilities for weaners and fatteners, that were thoroughly cleaned and disinfected at least one week before transfer.

Monitoring

Mycoplasma monitoring was carried out after the strategic medication to evaluate the eradication programme success.

All serology tests (ELISA, n=155) and antigen tests on oral fluids and nasal swabs (PCR, n=30) were negative for M. hyo over a time period of 30 weeks (Table 1). Lungs at slaughter check did not show typical mycoplasma lesions.

Impact on technical performance

Clinical signs of enzootic pneumonia were not observed afterwards. A clear improvement of the general health status and technical performance of suckling piglets, weaners and finishers born after the eradication was noted. In addition, the Vetmulin administration also supported the control of concurrent infections like ileitis, mycoplasma arthritis and pneumonia caused by other bacteria. An enormous performance boost was noted immediately after the eradication programme (Tables 2, 3, 4).

Conclusion

Eradication of enzootic pneumonia is by far the most effective and cost-efficient way to improve herd health status, technical performance and animal welfare long term.

In this multi-site production system, M. hyo was successfully eradicated by a strategic medication programme with Vetmulin in combination with extensive biosecurity and hygiene measures.

This programme does not require a total depopulation of the sows or a stop in farrowing and results in a high and quick return on investment. Furthermore, the repeated use of antimicrobials and preventive vaccination against M. hyo was stopped. Huvepharma is your reliable partner for tailor-made eradication programmes suitable for different pig production systems. ■

References are available from the author on request

Table 4. Technical data of fatteners comparing the last fattening batch before and the first batch after treatment (n=650).

	Before	After	Difference
Daily weight gain (g/day)	813	936	+123
Feed conversion rate	2.73	2.54	-0.19
Days to slaughter	120	113	-7
Liveweight at slaughter (kg)	121.8	127.5	+5.7
Carcase weight (kg)	94.14	97.04	+2.9