



Herd situation and experience in Thailand to control PRRS

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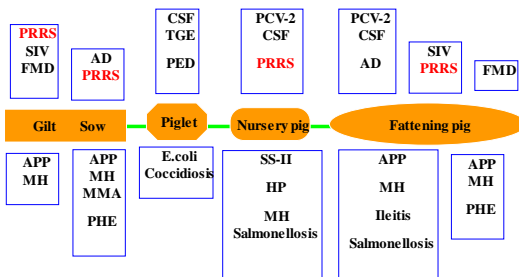
Pig production in Thailand

- 18,000,000 Fattening pigs
- 700,000 Sows on production

Population 65,000,000 people



Disease distribution in Thai swine herd



Suppression of pig immunity

- PRRS
- PCV2
- CSF



Topics

- Serological patterns using HerdChek PRRS 2XR virus antibody test kit (IDEXX, USA)
- The genetic distribution of PRRS using phylogenetic study of ORF5
- The investigation of the interaction among PCV2, CSF and PRRS under field condition in pig dense area
- The strategies used by swine practitioners in prevention and controlling PRRS outbreak



A. PRRS serological survey during 2005-2009

The study was carried out in 10 commercial swine herds in dense area of Thailand (five farms from Nakhonpathom province and five farm from Ratchaburi province) during January 2005 to December 2009.





Herd PRRSV vaccination

	Herds in Nakhonpathom					Herds in Ratchaburi				
	A	B	C	D	E	F	G	H	I	J
SOP (Sows/herd)	1,200	1,000	800	2,000	1,500	2,500	10,000	1,000	900	1,000
Gilt	EU	US	US	US	Acclimatize	EU	EU	US	US	US
Pregnant sow	EU	EU	No vacc	US	No vacc	No vacc	US	US	No vacc	No vacc
Mass vaccination	No vacc	US	No vacc	US	No vacc	No vacc	No vacc	No vacc	US	No vacc
Suckling pig	No vacc	US	No vacc	US	No vacc	No vacc	No vacc	US	No vacc	No vacc

EU = EU strain kill vaccine
 US = US strain live vaccine
 Mass vaccination = every 4 months

Acclimatize = Acclimatization
 No vacc = No vaccination



Mean S/P ratio of PRRS sero-positive Thai pig 10 herds during 2005-2009

Group of pig (n=10/group)	Herds in Nakhonpathom					Herds in Ratchaburi				
	A	B	C	D	E	F	G	H	I	J
Nursery	1.534	1.568	1.192	1.843	1.287	1.254	1.432	1.939	1.529	1.104
Fattening	1.156	1.534	1.234	1.787	1.438	1.432	1.532	1.678	1.298	1.593
Gilt	1.215	0.459	1.547	1.634	0.532	1.932	0.754	1.967	1.432	0.665
Sow	1.623	1.593	1.245	1.998	1.468	1.876	1.689	2.334	1.643	1.598
Boar	1.117	1.089	0.985	1.115	1.076	0.467	1.154	1.257	1.342	0.967

PRRS status was monitored once-twice a year.

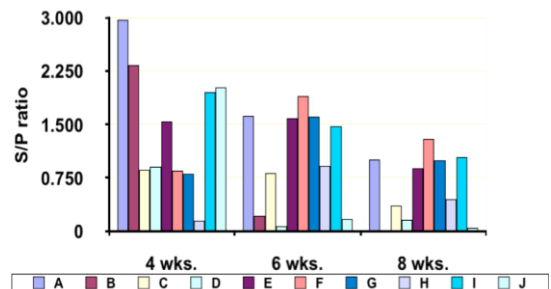


Mean pig mortality (%) of PRRS sero-positive Thai pig 10 herds during 2005-2009

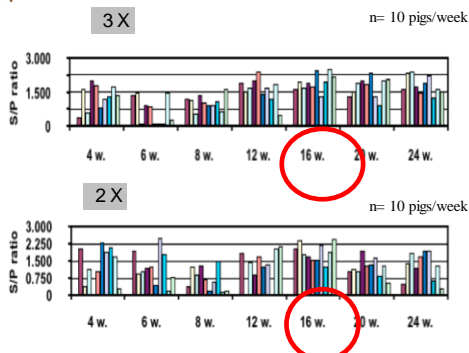
	Herds in Nakhonpathom					Herds in Ratchaburi				
	A	B	C	D	E	F	G	H	I	J
Pre-weaning death	8.5	10.2	10.6	15.7	10.7	10.4	9.6	11.8	9.5	8.9
Nursery death	5.1	6.7	8.5	12.4	5.4	7.4	6.5	15.3	10.4	5.8
Fattening loss	6.7	8.6	5.3	10.6	7.9	9.4	8.4	15.8	11.3	10.7
Sow death	7.6	8.9	6.8	9.7	5.4	7.5	7.6	10.2	9.7	8.1



Mean S/P ratio of PRRS sero-positive of crossbred Landrace x Yorkshire (LY-2X) Thai nursery pigs



Farm G



Result

- Under field condition, the different herds had different pattern of the antibodies titer for PRRS. The either acclimatization or vaccination with PRRS vaccine may not completely control the viral shedding.
- The control of PRRS might also differ among the herds depending on different farm management practice under field conditions.



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B. ORF5 PRRS Genetic Sequencing during 2005-2009

- The ORF5 region can be applied for genetic diversity, identification and differentiation of PRRSV.
- Ten PRRS viruses of replacement gilts from 10 Thai swine herds were isolated and analyzed in the ORF5 region.
- Sequencing and Dendograms
 - Phylogenetic analysis
 - Nucleotide sequencing



PRRSV detection by using RT-PCR in Replacement gilts

	Herds in Nakhonpathom					Herds in Ratchaburi				
	A	B	C	D	E	F	G	H	I	J
PRRSV-US										
PRRSV-EU										
PRRSV-US and EU										



ORF 5 Genetic Sequencing

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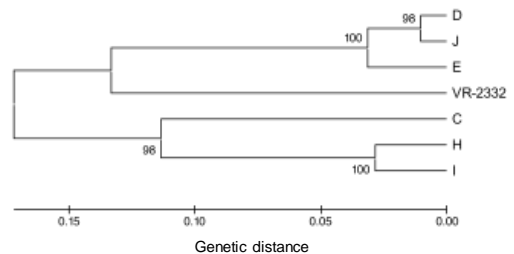
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GGCTAGCTAA CAAATTTGATTGGGCAAGTGGAGAGTTTTGTCACTTTCCGTTTT
GACTCACATTTGCTCCTATGGTGCCTCACTA CCAAGCCATTTCTTTGA CA CA GTC
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AAGGGGCAAAGTTGA GGTGCAAGGTCACTCTGATCGA CCTCAAAGAGTTGTGC
TTGATGTTCCGTGGCAA CCCC TATAACCAGA GTTTC A GCGGAACAATGGGGTC
GTCCCTAG >600 Nucleotides
  
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	Thai US genotype	Thai EU genotype
Nucleotide size	603	606
Amino acid size	200	201

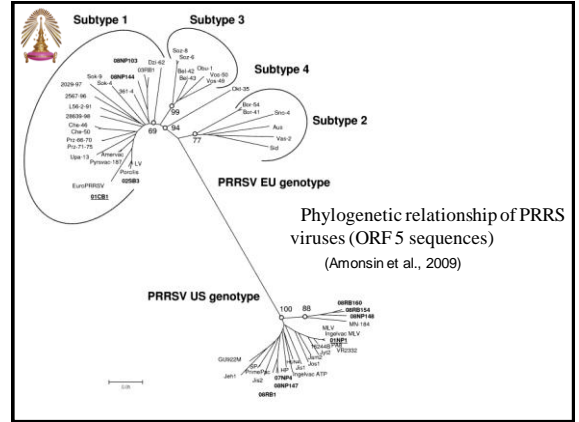
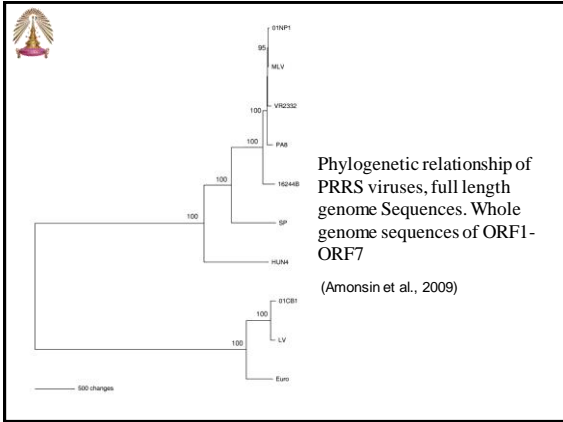


Pair-wise sequence comparison of Thai PRRS viruses during 2005-2009 (% nucleotide identity based on ORF5)

	Herds in Nakhonpathom					Herds in Ratchaburi				
	A EU	B EU+US	C US	D US	E US	F EU	G EU+US	H US	I US	J US
A EU	100	89.5	60.4	59.2	60.1	99.3	90.2	59.2	59.1	58.9
B EU+US		100	61.5	59.0	59.5	88.9	98.6	59.0	58.7	58.8
C US			100	99.5	99.1	59.1	59.4	98.5	99.7	97.8
D US				100	99.2	60.1	59.2	98.6	98.9	98.7
E US					100	60.2	59.1	98.4	98.7	98.9
F EU						100	89.3	59.4	58.6	58.1
G EU+US							100	58.7	58.9	59.5
H US								100	99.4	99.8
I US									100	99.5
J US										100



Dendrogram based on the nucleotides sequence of the ORF5 gene of PRRSV (US genotype)



Result

- These data showed both EU and US genotypes are still circulating in pig-producing areas of Thailand with predominantly the US genotype.
- No evidence of imported new PRRSV strains was found in this study.
- The Thai viruses from both areas were of both US and EU origin and still exhibited the highest sequence similarity to those of their own prototypes.

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The post-weaning multi-systemic wasting syndrome pigs from 10 farms in pig dense area were investigated in 2008-2009.

The interaction among PCV2, CSF and PRRS from pre and post-weaning multi-systemic wasting syndrome pigs (2008-2009)

Pooled organ : tonsil, lung, spleen, kidney, lymph nodes (thoracic, abdominal, mesenteric and inguinal lymph node)

Farm	SOP	Suckling pigs (10 pigs/farm)						% Pig loss	Nursery pigs (10 pigs/farm)						% Pig loss
		Pooled sera			Pooled organs				Pooled sera			Pooled organs			
		PRRS	PCV2	CSF	PRRS	PCV2	CSF		PRRS	PCV2	CSF	PRRS	PCV2	CSF	
1	3,000	+	-	-	+	-	-	18	+	+	-	+	-	-	33
2	500	-	-	-	-	-	-	10	+	-	-	+	-	-	24
3	800	-	-	-	-	-	-	9	-	+	-	-	-	-	22
4	2,000	-	-	+	-	-	+	20	+	+	+	+	+	+	45
5	600	-	-	-	-	-	-	7	-	-	-	-	-	-	3
6	800	-	-	-	-	+	-	11	+	-	-	+	-	-	26
7	1,200	-	-	-	+	-	-	15	+	-	+	+	+	-	40
8	2,500	-	-	+	-	-	+	17	+	+	+	+	+	+	50
9	1,000	-	-	-	-	-	-	8	-	+	-	+	+	-	25
10	1,000	-	-	-	-	-	+	12	+	-	-	-	+	-	15

PCR diagnosis



Result

- These data showed that the outbreak with the interaction among PCV2, CSF and PRRS under field condition was seen in some areas of Thailand especially in Nakhon Pathom province with had high nursery pigs mortality (40-50 %) in 2008-2009.
- To prevent the adverse interaction among these 3 pathogens for PRRS control, the farm should avoid to simultaneously vaccination pigs with two kinds of live vaccines.



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Gilt acclimatization

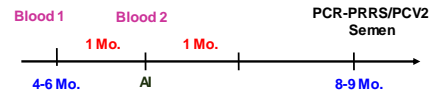


S/P ratio 0.4 – 2.0 Enter to mating
 S/P ratio > 2.0 PCR confirmation before mating

Cool down step need more than 90 days



Boar management



5.5 Mo. Vaccination with killed PRRS vaccine

Blood ELISA-PRRS

1. 4-6 Mo.
2. Before entering the AI unit

Semen PCR – PRRS and PCR – PCV2)



Serological examination in sows, nursery pigs and fattening

Target : Blood from sows, nursery pigs and fattening pigs 1-2 time/day

Sow

- 1.1 30 pigs
- 1.2 parity of 5 samples

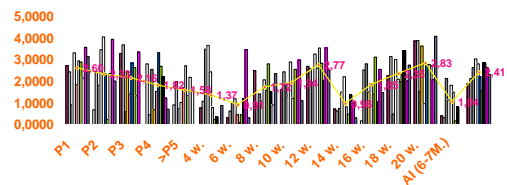
Nursery and fattening

- 2.1 Age at 4, 8, 12, 16, 20 and 24 weeks old
- 2.2 5-10 sample/period



Serological pattern of PRRS in sows, nursery pigs and fattening pigs

S/P ratio





- > Blood examination before acclimatization
30 % for ELISA - PRRS-PCR
- > Blood examination after acclimatization
30 % for ELISA - PRRS-PCR
- > Blood examination before using
50 % ; S/P ratio >1.90 for PCR – PRRS

Pooled sample



Summary

- The study does provide some interesting data on the serological pattern and the genetic distribution of the PRRSV isolates in Thailand.
- Those data may be useful for effective prevention and control the outbreak of PRRSV infection



Thank you for your attention

