Clostridium perfringens in cases of neonatal piglet diarrhoea in south east Asia

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Neonatal diarrhoea can be a significant cause of financial loss in modern farms. Traditionally farmers have focused on E. coli as the most likely cause of these diarrhoeas, but in recent years, publications on clostridial infections in piglets (Clostridium perfringens Type A, Clostridium perfringens Type C and Clostridium difficile) indicate that in the USA and Europe, the clostridial pathogens are sometimes more commonly diagnosed in neonatal diarrhoea cases than is colibacillosis.

Recent surveys in south east Asia have also demonstrated significant populations of Clostridium perfringens type A to be present in neonatal diarrhoea cases in Thailand, the Philippines, Indonesia and Vietnam. Not unexpectedly, these results indicate the problem is as significant in south east Asia as numerous publications reveal it to be in the USA, Canada and Europe.

Recent problems with severe outbreaks of porcine epidemic diarrhoea (PED) in several countries in south east Asia have overshadowed other diarrhoea problems, but surveys have demonstrated significant populations of Clostridium perfringens involved in these cases.

Use of the BioX test strip (K195) showed high levels of Clostridium perfringens type A in 71% of scouring neonatal piglets tested in Thailand, 70% in Philippines, 80% in Indonesia and 42% in Vietnam.

Clinical results from sow medication trials in Asia reflect the results of the published work from the USA, showing that medication programs in the sow herd targeting clostridia can have a significant positive effect on piglet health and sow herd production.

Test kit details

Diagnostic test kits from BioX Diagnostics were selected as the company produces a wide range of ELISA and test strip diagnostic tests for the domesticated species (cattle, sheep, swine, poultry, fish, rabbits and horses).

The BioX K195 test strip system was chosen for its ease of use and rapid response time. The strip will detect Clostridium perfringens when present at a level of 1×10^6 organisms (cfu) per ml.

The use of the diagnostic kit involves taking a small faecal sample with the plastic scoop from the kit, taking a level scoopful, and then placing the faecal sample into the provided diluent in the sample bottle, sealing with the lid and shaking the sample.

Age (days)	Positive/ samples	Positive (%)
1	3/3	100
2	3/3	100
3	2/3	67
4	4/5	80
5	2/4	50
6	0/2	0
	14/20	70

Table 1. Results of BioX Clostridium perfringens test on diarrhoea affected neonatal pigs in the Philippines.

Age (days)	Positive/ samples	Positive (%)
1	1/1	100
3	2/2	100
4	1/2	50
5	2/3	67
< 7	22/59	37
Total	28/67	42

Table 2. Results of BioX Clostridium perfringens test on diarrhoea affected neonatal pigs in Vietnam.

The diluent is allowed to wick up the test strip and a positive test is indicated by the appearance of two lines.

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Fig. 1. Results of BioX Clostridium perfringens test on diarrhoea affected neonatal pigs in the Philippines.

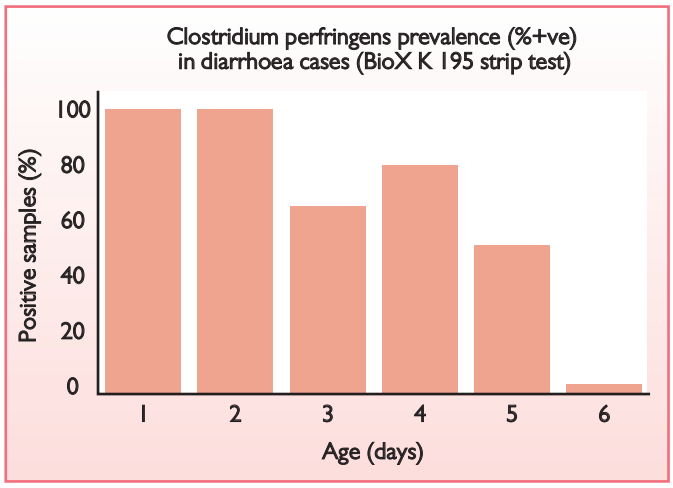
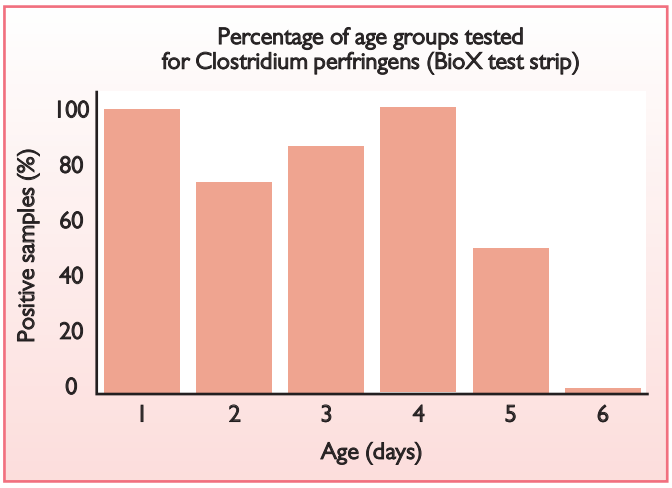


Fig. 2. Results of BioX Clostridium perfringens test on diarrhoea affected neonatal pigs in Thailand.



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In most cases we attempted to take two fresh samples per litter, but sometimes only one sample could be sourced.

Survey details

A survey showed significant levels of Clostridium perfringens in a farm previously diagnosed with a PED outbreak in the Philippines. The usual PED feedback procedures had been implanted, resulting in a temporary cessation of the problems, but then diarrhoea re-appeared, primarily as a neonatal problem.

The younger pigs (1-7 days of age) had a severe profuse diarrhoea affecting the entire litter. Pigs lost condition rapidly, but their appetite remained good, particularly in the early stages.

There was also some vomiting observed in these pigs. The management team observed that there appeared to be a good response to antibiotic treatments.

Only piglets were affected, with no sow or growing herd diarrhoea. Samples were taken from litters with diarrhoea, in most cases two fresh samples were taken from each litter, however, in some cases only one sample could be sourced.

Table 3. Results of BioX Clostridium perfringens test on diarrhoea affected neonatal pigs in Indonesia.

Age (days)	Positive/ samples	Positive (%)
1	3/3	100
2	1/1	100
3	3/3	100
4	6/9	66
5	2/2	100
6	0/1	0

Age (days)	Positive/ samples	Positive (%)
1	5/5	100
2	3/4	75
3	8/9	88
4	4/4	100
5	3/6	50
6	0/2	0
	23/30	76.7

Table 4. Results of BioX Clostridium perfringens test on diarrhoea affected neonatal pigs in Thailand.

In a survey of diarrhoea affected pigs in the 1-6 day age group, 70% tested positive. Pigs in the younger groups (1-2 days of age) were 100% positive.

A survey across 13 farms in Vietnam (without PED problems) revealed that 42% of piglets with neonatal diarrhoea tested positive on the BioX test strips.

Tests carried out in four herds in Indonesia (without PED problems) showed similar results (see Table 3).

Surveys carried out in Thailand in nine herds (also without PED problems) showed similar results (see Table 4).

High percentage positive

A high percentage of the samples from the scouring neonatal piglets were positive for Clostridium perfringens, especially in the younger age groups. 59 of the 83 faecal samples (71%) tested positive.

Some 30 of the 83 samples had the age accurately recorded, with the remaining 53 samples simply recorded as having been taken from piglets of five days old or less.

Pigs without specifically recorded ages are shown in Table 5, and show very similar overall results.

The data shown in Fig. 2 clearly indicates the affected age groups.

More recently, unpublished data from Dr Athipu, Chulalongkorn University, has shown significant presence of Clostridium perfringens in intestinal scrapings taken from neonatal PED cases in Thailand, with 100% of scrapings being positive for Clostridium perfringens on an M gene Gel PCR test, 91% of these being positive for the beta cp beta2 toxin PCR test.

This is of interest as Dr Mike Yaeger, Iowa State University, Ames, Iowa, has noted that it has been rare to detect beta2 toxin in the small intestine of healthy, control pigs and notes there is a strong correlation between the presence of alpha and beta2 toxin in the intestine and gross evidence of diarrhoea.

Age (days)	Positive/ samples	Positive (%)
1-5	36/53	68
Age not recorded		

Table 5. Results of BioX Clostridium perfringens test on diarrhoea affected neonatal pigs in Thailand.

He does go on to comment that Clostridium perfringens type A remains something of a diagnostic enigma and efforts should continue to refine the diagnostic criteria for the disease.

Conclusion

Clostridium perfringens is a significant pathogen and may be associated with other more severe enteric diseases such as porcine epidemic diarrhoea (PED). ■

References are available from the author on request