

Parasite impact, transmission and control

PARasites in Organic Livestock (PAROL)



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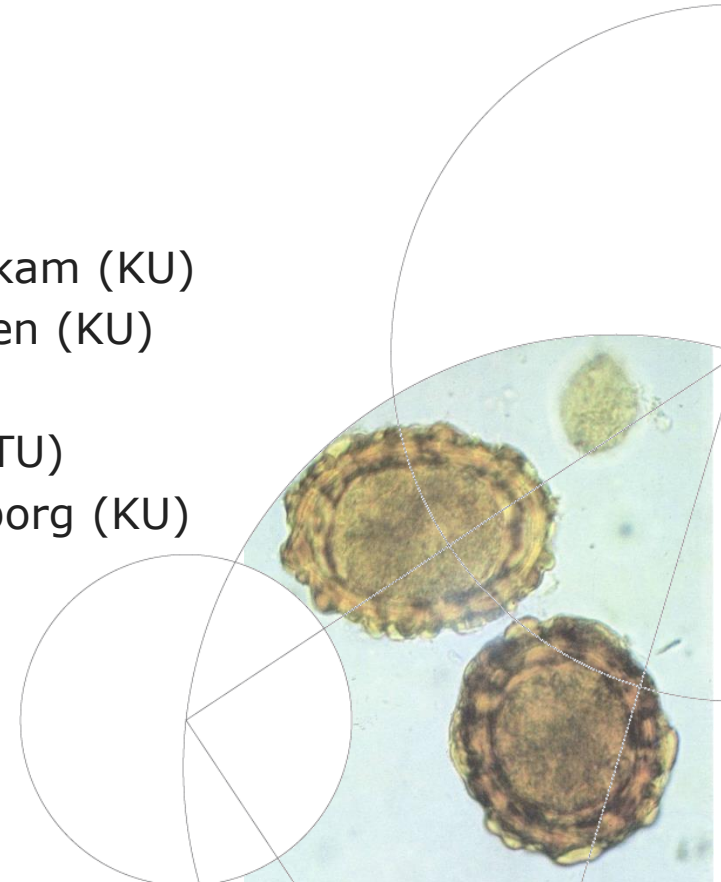
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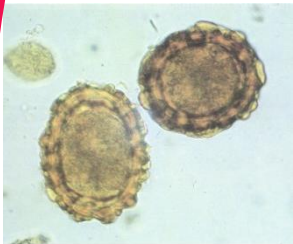




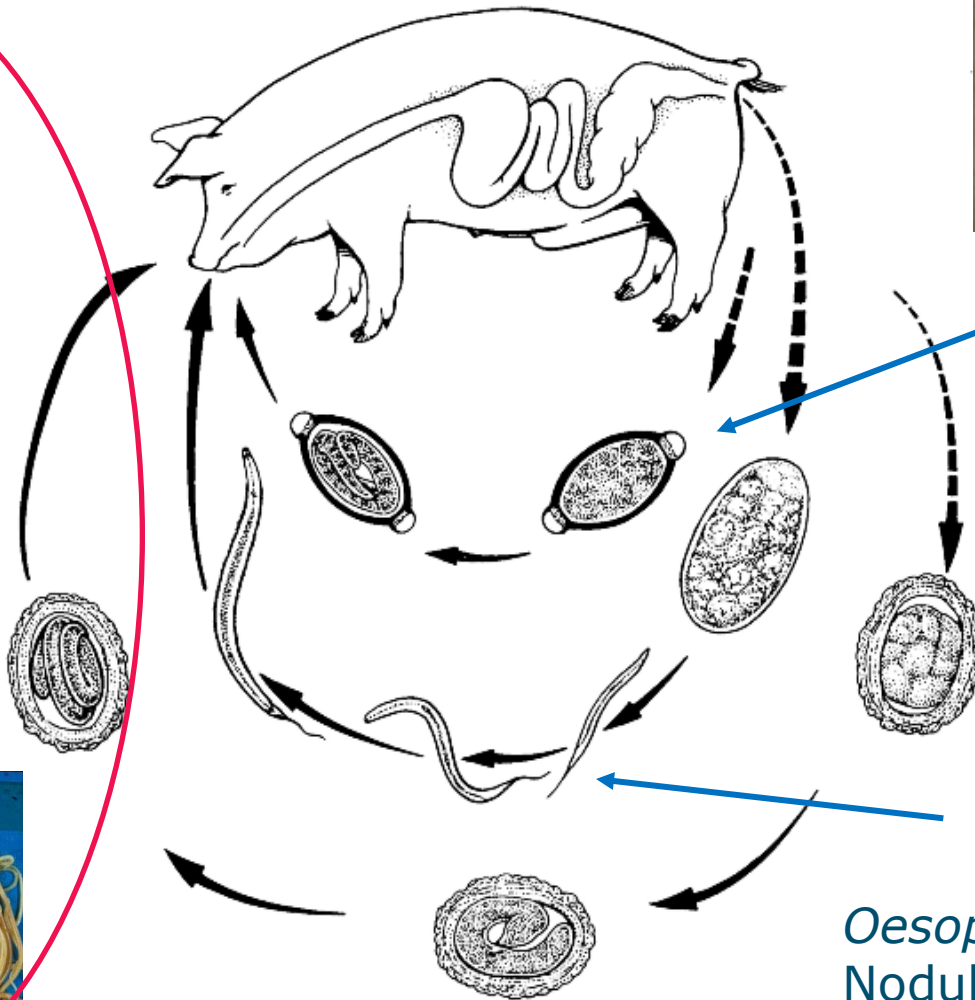
Project aim:

Monitor parasite transmission in 5 organic farms to provide advisory services to farmers

Intestinal worms



Ascaris suum
Round worm



Trichuris suis
Whip worm



Oesophagostomum spp
Nodular worm

Are intestinal worms a problem?

Pigs are fairly robust
but parasites may cause:

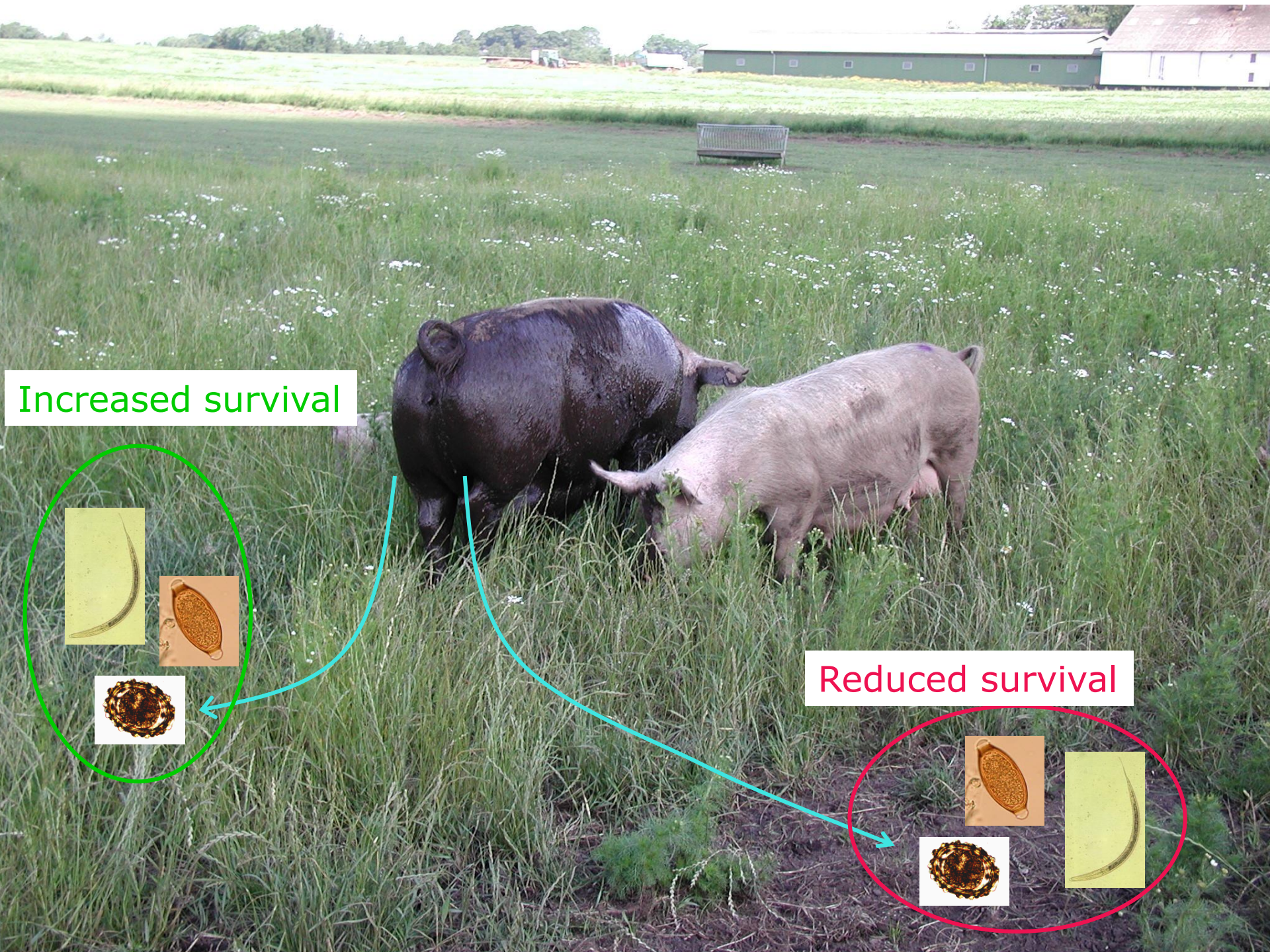
- Reduced weight gain
- Reduced feed conversion
- Anorexia
- Liver condemnation
- Enlargement of intestines at the cost of meat?
- Increased weaning diarrhoea?
- Reduced effect of vaccines?
- Deaths (only at extreme infection levels)



Are intestinal worms a problem?

Difference in relation to uninfected pigs (20 kg) at weaning at week 7

Weight gain	-2,5 %
Slaughter weight	-4,3 %
Carcass weight/live weight	- 2,0 %
Organ weight in relation to slaughter weight:	
- Small intestine (round worm)	+19,1 %
- Large intestine (whip- & nodular worm)	+16,1 %
Cross sectional area of <i>M. longissimus dorsi</i>	-5,0 %



Increased survival



Reduced survival



Survival of round worm eggs in soil

The survival of eggs in soil and transmission levels to tracerpigs were monitored over time on pastures contaminated in 2001:

- Most eggs died during the first winter, but those that survived long-term were infective to pigs
- The number of infective eggs peaked two years after the pastures were first contaminated, but a low number of eggs were still detected in 2010
- The highest worm burdens were detected in the tracer pigs three years after contamination, where after they declined, but in 2010 the pigs still became infected after only four days on the pastures

2013?

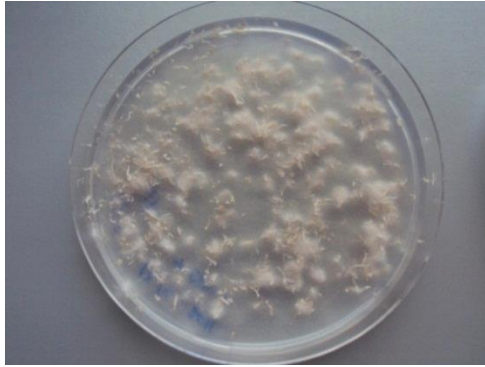
Ploughing may transfer eggs deeper into the soil thus reducing overall transmission to some degree

Survival of round worm eggs in soil

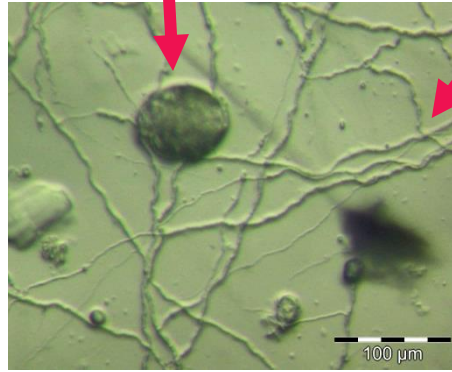
After 9 years



Micro fungi



Round worm egg



Hyphae



Two different fungal species had no effect on the survival and development of the eggs of the round worm

← Increased hygiene

→ Increased risk of parasite transmission

→ Increased quality of life



Minor accumulation of faeces (eggs), easy to clean, dry out and disinfect between batches



Accumulation of faeces (eggs), but pens can be cleaned, dried out and disinfected between batches

Drugs



Faeces (eggs) cannot be removed, must rely on natural mortality!

Disinfectants

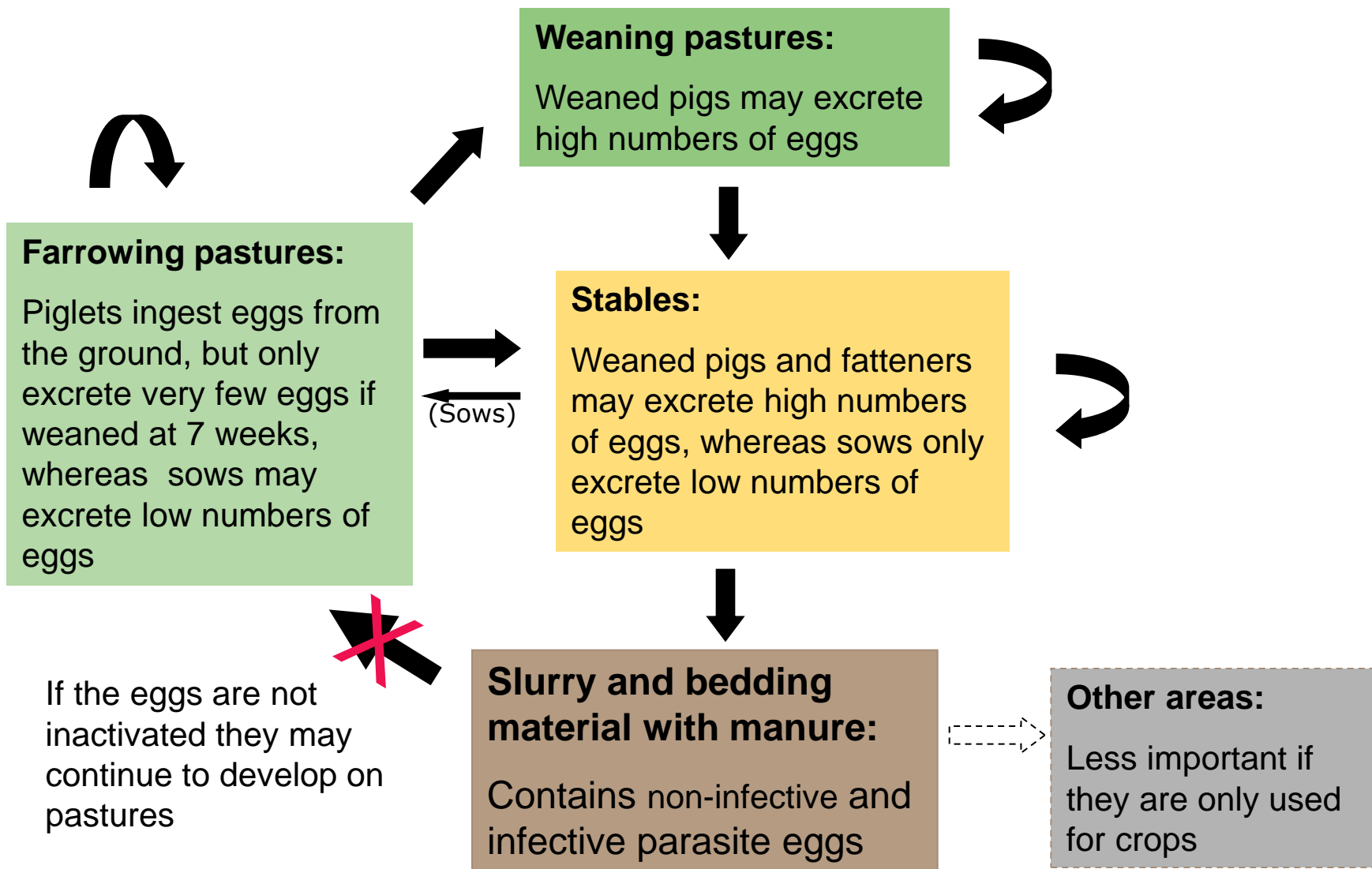


The effectiveness of disinfectants against round worm eggs was tested in a laboratory model:

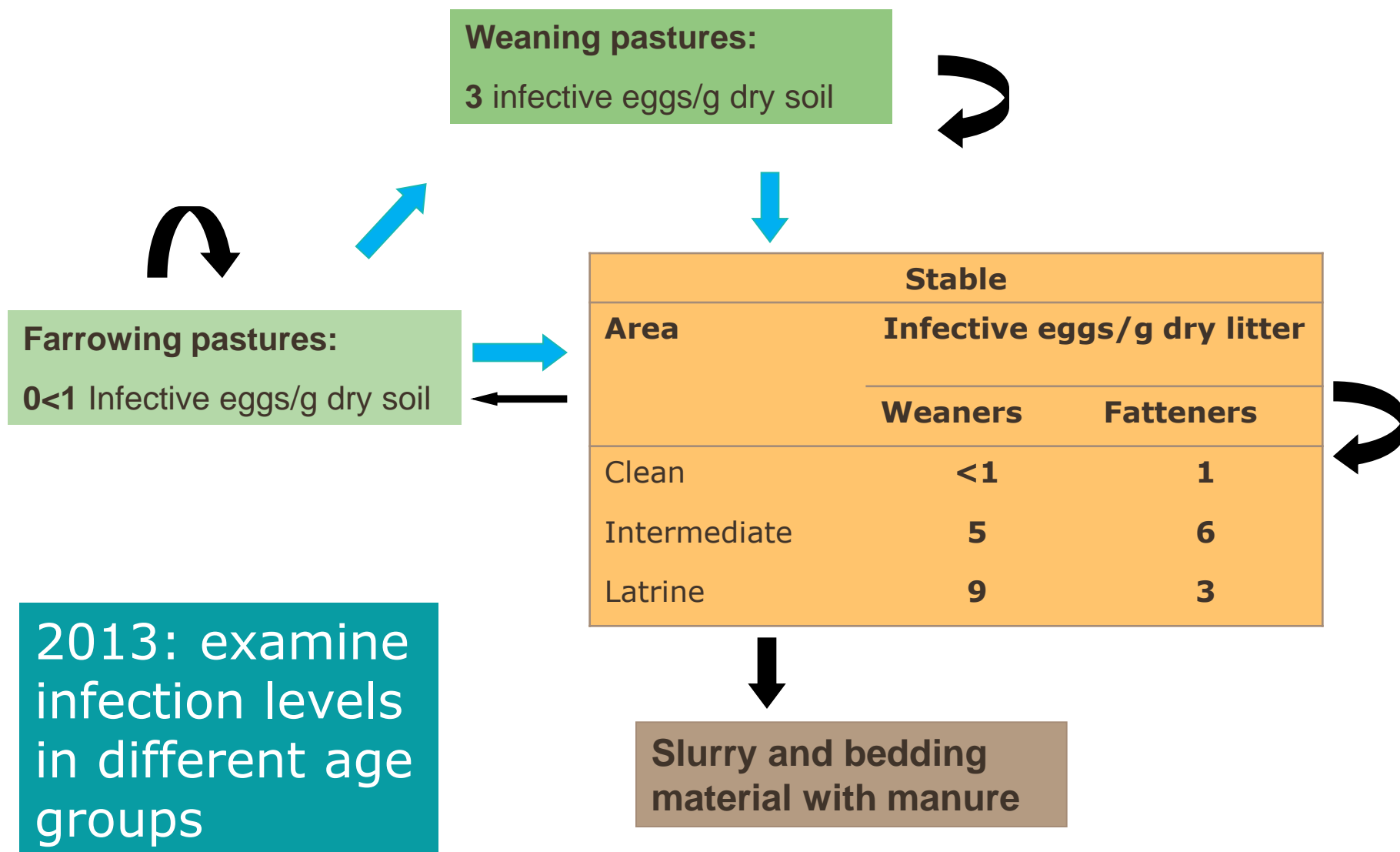
- The majority of eggs kept in a 10% Virkon S solution survived for five hours
- Almost all eggs had died at being kept in 3% FL-des-Allround for two hours

Effectiveness on farm?

Potential transmission pathways



Potential transmission pathways



2013: examine infection levels in different age groups

Liver white spots



The number of superficial liver white spots due to migrating round worm larvae was enumerated at slaughter for 5 organic pigs herds:

- 83-96% of the livers had white spots
- Overall, the mean number of white spots was low, but the texture of the livers indicated that the pigs may have been partially immune to the migrating larvae due to high previous exposure

Survival of round worm eggs in deep litter

Viability highest in latrine, but very few eggs were infective, most of the infective eggs were in the clean areas

High temperatures kill eggs

pH may have an adverse effect(?)

Ammonia may kill the eggs (especially if combined with high temperatures)

Moisture improves survival

Survival of round worm eggs in slurry

The combination of a high level of ammonia and a high temperature can kill off the eggs in less than two days

However, at lower temperatures high ammonia levels are less detrimental and a few eggs may live up to four months

Manure heap is being examined

Fermentable dietary carbohydrates

The effect of dried chicory roots in the feed on nodular worm egg excretion and worm burdens was monitored over a period of nine weeks:

- Almost complete depression of the egg excretion after only three days on the chicory diet
- Overall, the worm burdens were reduced by approximately 60% by the chicory diet

Nodular worms

***Cryptosporidium* spp**

Zoonotic species?

Excretion of oocysts was examined in the three organic pig farms:

Overall prevalence was age related in that the highest prevalences were recorded for younger animals (young pigs > fatteners > piglets) compared to sows

Conclusions

- Outdoors:
 - Pasture rotation is still the only effective control measure, but it is constrained by land availability
 - Even semi permanent weaning paddocks may accumulate high numbers of eggs and increase infection levels of pigs brought into the stable
- Indoors
 - Bedding material/deep litter may be less of a risk factor than anticipated
 - Stable layout may be an important transmission determinant
- Control should be multifactorial
 - Drugs are still the overall most effective single means of reducing parasite infection levels

