RESPIRATORY DISEASE
What you will learn in this session:

- What respiratory diseases exist in pigs in Australia.
- How they impact on the health, welfare & performance of the pigs & the herd.
- How to diagnose them.
- How to treat them.
- How to minimise their impact on-farm.
Mycoplasma pneumonia

- Contagious pulmonary disease of pigs.
- Caused by *Mycoplasma hyopneumoniae*.
- Characterised clinically by:
  - Coughing
  - Unthrifliness
  - Very low mortality
Incidence of Mycoplasma-related respiratory disease

- Biggest health problem Worldwide
- > 90% Australian herds affected
- Cost approx $70/ sow /yr.
- Due effect on:
  - ADG (670g/day _ 590 g/day)
  - FCE ( 3.6 hfc to 4.2 hfc )
  - Medication costs ( 10c/kg)
  - Mortality (1% to 5% +)
Clinical signs

- 2 week incubation period
- Clinical signs depend on “infection pressure” placed on the pigs in the herd.
- Acute form uncommon.
  - Deaths all ages.
- Chronic or enzootic form
  - Infected 3-18 weeks of age
  - Dry cough
  - Sneezing
  - Variation in growth rate in batch
  - Severe coughing, pneumonia & death with 2’ infection
How is it Transmitted?

- Inhaled from aerosol or direct contact with carrier pig. (windborne 3 K)
- Affects ciliated epithelium
- Lesions seen 3-14 days post infection
- Seroconvert 8 weeks post infection
Mycoplasma hyopneumoniae
Diminishes mucociliary defence
Diagnosis

- Clinical signs—coughing with low mortality
- Decreased ADG and FCE
- Gross pathology (on-farm & at abattoir) & Histology
- Serology— at slaughter best to confirm; or at 4, 8, 12, 16, 20 weeks to control
- PCR on affected lung lesions
Cross-sectional MH Serology in a continuous flow herd

Note seroconversion starts at 12 weeks of age.
Cross-sectional MH serology in an AIAO herd

Note seroconversion delayed until 25 weeks.

Huntly AIAO Mhyo 1997

- 10 wks
- 17 wks
- 25 weeks

Suspect - 3-4
Positive - 4 and above
Treatment

- **Antibiotics**
  - In feed or in water
  - Time them early—during colonization (2 weeks before the cough)
    - Tetracyclines-chlortetracycline @ 22mg/kg
    - Tiamulin @ 8 mg/kg
    - Pulmotil
    - Lincomycin @ 8mg/kg
Control of PRDC

- Vaccination (lung score 15% to 2%)
- Air quality
  - AIAO
  - Ventilation
  - Housing
- Minimise vertical transmission (age-segregated rearing)
- Minimise horizontal transmission
  - Correct stocking density
- Strategic medication
Principles of Herd Health Management in North America

*All-in / All-out: Benefits*

- Purdue University All-in / All-out grow-finish study - without MEW or SEW
  - Average daily gain improved 12%
  - Feed efficiency improved 7%
  - Respiratory health

- **Continuous flow pigs**
  - 94% of pigs had pneumonic lesions, average of 15% of lungs involved

- **All-in / All-out**
  - 52% of pigs had pneumonic lesions, average of 4% of lungs involved

- Results Vary by farm and management practices
Eradication of MH

- Total Depopulation
- Cost $700/ sow
- Logistical nightmare
- Swiss depopulation
- About $100 sow
- Still a logistical nightmare
- Beware of reintroduction
Swiss depopulation

- Stop mating for 2 weeks, 14 weeks before day 0
- At day -42 & -14, vaccinate with MH
- At day -7 get rid of all animals less than 10 months of age.
- Day -7 to -1 clean up farm
- Day 0 commence medication at high level for 14 days
- Day 15 + sows farrow down.
Actinobacillus pleuropneumonia = APP

- Severe respiratory disease
- Most common complication of RDC
- Affects growers/finishers/ weaners less common
- Highly contagious
- Severe haemorrhagic pneumonia
- Economically devastating
- Welfare disaster
Aetiology and pathogenesis

- Actinobacillus pleuropneumonia
  - Serovars 1*, 5, 7, 12 and 15*
- Aerosol transmission from carriers
- Rapid onset of disease (4-12 hrs)
- Small dose lung infarcts
- Large dose septicaemia (9 hrs post inf)
- Seroconvert 3-4 weeks post infection.
Clinical signs - Acute

- Sudden death
- Fever
- Reddened skin
- Cyanosis
Zero plus 10 hrs
Clinical signs - subacute

- Anorexia
- Reduced growth rate
- Coughing
- Variable mortality
Pleuropneumonia

Lungs are solid, black/purple

clotted serum on lungs
Fibrin sheets overlaying areas of haemorrhagic and pneumonia. Affecting mainly diaphragmatic lobe.
Pleuropneumonia

Fibrinous pleuritis and haemorrhagic infarcts in 16 week old grower
Pleuropneumonia

Interstitial oedema, haemorrhagic necrosis and fibrinous pleurisy. APP in 14 week old pig
Lining of lung sticks to rib cage at slaughter = pleurisy
Lesions at processing

- Pleurisy
- Pericarditis
- Abscesses
Risk Factors for clinical pleuropneumonia

- Housing systems with a high degree of horizontal transmission (commingling, continuous flow)
- Housing systems that put a high degree of infection pressure on the pigs:
  - Overcrowding
  - Ventilation/ temperature fluctuations
  - Stress
    - Movement
    - PST
    - Feed changes
Diagnosis

- Clinical signs
- Gross & histopathology
- Culture & sensitivity
- APP serology (for 1 and 15)
- APP PCR
Differential diagnosis

- **Glassers disease**
  - Occurs earlier
  - Likely to see other clinical manifestations (meningitis, wasting)
  - No hemorrhagic infarcts in lung
  - Peritonitis also

- **Pasteurella pneumonia**
  - No hemorrhagic infarcts in lung
  - Age and necropsy signs similar
  - Culture organism
Treatment

- Penicillin injection of individual pigs
- Anti-inflammatory (Flunixin) injection
- Water medication of at risk group
  - Cover for 50%+ reduction of water intake
- Antibiotic sensitivity pattern needed
- Amoxycillin (30mg/kg), Pulmotil, Tetracyclines, Tiamulin
Prevention

- Age-segregated rearing & AIAO
- Vaccination of sows and weaners
  - Sows-increases maternal immunity?
  - Progeny-reduces mortality only
- Strategic medication
  - Hard to get it right-hard to predict!
  - Cough index
  - Seroconversion pattern
Cross-sectional and Longitudinal App 1 serological values for different aged pigs an AIAO herd

App 1 titres

Pig Age (week)
Eradication of APP

- Swiss depop alone won’t work
- Total depopulation or
- Vaccination of sow and MEW
- Medicated early weaning; medicate lactating sow for 5 weeks (Pulmotil @ 15mg/kg+).
- Wean at 10 days to a new site and medicate weaner diet
Glasser's disease (Haemophilus parasuis)

- 15+ strains of H parasuis
- Sometimes fatal
- Bronchopneumonia +
- Polyserositis
Clinical signs

- Usually weaners (sometimes other progeny)
- Cough, dyspnea, fever
- Nervous signs, meningitis
- Weight loss
- Rough hair coat
- Swollen, warm and painful joints
- Death with red to blue skin discoloration
In endemic herds infection in weaners usually result in poor doing pigs which in spite of treatment continue to fade away until destroyed as welfare cases.
Bronchopneumonia (DDX Mycoplasma)
Epidemiology

- Transmission from sow to piglets
- Infection with MAbs-no problems
- Infection without MAbs-disease
- Weaning stresses likely to predispose
  - Commingling
  - Overcrowding
  - Ventilation/ temperature fluctuations
Diagnosis

- **Clinical signs** (DDx other causes of weaner wasting; meningitis, septicemia)
- **Gross pathology**-polyserositis
- **Culture**-fresh swabs from untreated pigs; pleural/pericardial fluid best
- **Serotyping**-vaccine development
- **DNA fingerprinting**
Treatment

- Often ineffective
- Try Penicillin-based products (esp. Amoxycillin)
- TLC
Prevention

- **Fix the environment!**

- **Vaccination**
  - Need the right serotype
  - *Commercial vaccine (4, 5, 12)*
  - *Autogenous vaccine*
  - Sows to boost maternal antibody
  - Piglets when infection occurs later
Pasteurellosis

- A respiratory and septicaemic disease caused by *Pasturella multocida*
- May be sub clinical or associated with:
  - Pneumonia
  - Septicaemia
  - Mortality
  - Depressed growth rate
  - 2' to *M. hyo* and usually seen in growers or finishers
Post mortem findings

- Same as APP but no areas of necrotic hemorrhage.
- Confirm on culture.
Fibrinous bronchopneumonia due to Pasteurella infection

Note the absence of hemorrhagic infarcts
M.hyo bronchopneumonia with 2’ pasteurella
Treatment and prevention

- Treat individual pigs
- Water medicate at-risk group
- Antibiotic sensitivity- resistance
- Tetracyclines, penicillin, potentiated sulfonamides.
- Prevention see RDC.
**Mycoplasma hyorhinis**

- Seen in 3-10 week old pigs
- Polyserositis
- Arthritis
- Pneumonia
- 2’ to *M. hyopneumonia*
Clinical signs

- Decreased growth rate
- Low grade fever
- Hairy coat
- Arthritis
- Necropsy
  - Fibrinous pericarditis, pleurisy. Peritonitis and arthritis
Treatment and differential diagnosis

- Tiamulin or tetracyclines
- DD. Glassers, APP, Strep.
Mycoplasma hyosynovia

- Affects pigs > 35 kg
- Acute lameness, swollen joints
- possible cause of lameness in replacement gilts
- DD, Erysipelas and OCD
- Tiamulin treatment of choice
M. hyosynovia infection

Excess fluid in shoulder joint
Causes of Sneezing

- Poor air quality—dust in bedded systems
- *M. hyopneumonia*
- Atrophic rhinitis
- *Bordetella bronchiseptica*
- *Cytomegalovirus / IBR*
Atrophic rhinitis

- Relatively uncommon in Australia
- $21/sow/yr in affected herds due to growth depression
- *Bordetella bronchiseptica* (turbinate hypoplasia) + toxigenic *Pasteurella multocida* (type D)
- Non-progressive AR-non-toxigenic *P. multocida*
Clinical signs

- Depend on the environment
- Usually 8-12 week old pigs
- Sneezing, nasal discharge, bleeding, deformities
- Osteolysis & replacement fibrosis
- Growth retardation, reduced feed efficiency
Diagnosis

- Clinical signs
- Assess snout deviation at slaughter-X section snout
- Culture nasal swabs
- Must demonstrate P. multocida toxin to confirm (PCR)
Treatment/Control

- Improve environment
- Autogenous vaccines-bacterins
- Sow medication around farrowing
- Injectable tetracyclines to piglets @ 2, 7 and 14 days of age
- Medication post-weaning for 2 weeks
- Support for affected pigs
Bordetella bronchiseptica

- Common inhabitant in the nose of pigs
- Non-progressive AR
- Bronchopneumonia—uncommon
- Opportunistic invader
- Usually a problem in poorly managed systems
Cytomegalovirus/Inclusion body rhinitis

- Rarely causes clinical disease in Australia
- Host-specific Herpesvirus
- Transmission via nose-to-nose contact (urine, trans-placental)
- Dx-histo & demonstration of large intra-nuclear inclusion bodies in nasal epithelium; virus isolation
- DDx-non-progressive AR
- No treatment warranted for affected pigs - improve air quality
Streptococcus suis

- Sudden death or nervous signs in suckers, weaners and growers.
- Polyserositis & septicemia.
Clinical signs

- **Acute**
  - Sudden death
  - Laboured breathing, cough, cyanosis.

- **Subacute.**
  - Pneumonia
  - Coughing
  - fever
Note the outline of the lung lobules with fluid.

"Wet", heavy lungs (from Streptococcus-infected pigs)
Lesions on heart valves
XS fluid in heart sac
Wet, heavy lungs
Excess fluid in abdomen
Streptococcus
XS fluid in heart sac
Strep suis

Fibrin sheet peritoneal cavity
Normal bicupid valve

Vegetative endocarditis
Strep suis

Sero-fibrinous arthritis
Treatment & Prevention

- Correct any environmental issues!
- No vaccine exists in Australia
- Penicillin + Flunixin injection of individual pigs
- Water medication of at risk group - Tetracyclines, Amoxycillin, Tiamulin
Porcine Respiratory Disease Complex (Enzootic pneumonia)

- Mixed infection with:
  - Mycoplasma hyopneumonia
  - Pasturella multocida
  - Actinobacillus pleuropneumonia
  - Streptococcus suis.
    - Bordetella bronchiseptica
    - Haemophilus parasuis
Clinical signs

- Acute form ("18-week wall")
  - Sudden death + severe cough + poor growth
- Chronic or enzootic (endemic) form
  - Infected between 3-18 weeks of age
  - Dry cough
  - Sneezing
  - Variation in growth rate in batch
Is RDC causing a problem?

- What is the growth rate?
- Post mortem dead pigs
- Check coughing index
- Serology to MH & APP?
- Abattoir check of lung score
Coughing index

- Select about 50 pigs
- Wake them and count coughs for 3 min.
- Repeat * 3 lots
- Repeat next day
- Repeat every 2/4 weeks
- 3-5 coughs 3 min. borderline
- > 5 coughs intervene
- > 10 coughs = trouble
Managing RDC - In ascending order of preference

- AI/ AO by site/shed/room
- If too small to fill room, batch farrow.
Managing RDC - environment

- 250-300 pigs in batch
- 0.55 m² & 2.5 m³ / grower (65) kg
- 0.74 m² & 3 m³ / finisher (100kg)
- Clean between batches
- Insulate sheds
- Large ridge vents
- Effluent removal
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