COOPERS® PILIGUARD® PINKEYE-1 TRIVALENT VACCINE

TECHNICAL MANUAL

A UNIQUE VACCINE TO AID IN THE PREVENTION OF PINKEYE IN CATTLE

COOPERS®
EST. 1843

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COOPERS PILIGUARD PINKEYE-1 TRIVALENT VACCINE

Coopers Piliguard Pinkeye Vaccine is a unique vaccine in the Australian market – the only commercially available pinkeye vaccine for cattle in Australia.

CATTLE PINKEYE – OVERVIEW

A number of micro-organisms can contribute to the establishment of **Infectious Bovine Keratoconjunctivitis** (IBK), **Cattle Pinkeye**[1], or **Blight**. These may be viral or bacterial. The primary infectious agent involved in the development of pinkeye is the bacterium ***Moraxella bovis***[2], which can be carried in the nasal and ocular (eye) secretions of carrier animals for up to 12 months[3]. *M. bovis* attaches to the surface of the eye using pili and damages it by producing toxins and haemolysins which erode the cornea and cause ulceration and severe inflammation[2,4]. Flies play an important role in physically transferring the infective organism from infected to naïve non-infected stock[3,4,5].

Pinkeye is considered to be an economically important disease throughout Australia. A recent Meat and Livestock Australia (MLA) report estimates that the disease costs Australian beef farmers **$13.3 million** annually in lost production and treatment costs[6].

ECONOMIC COST OF PINKEYE

Direct Costs

- Production losses.
- Cost of treatment – drugs, labour, vet fees.
- Loss of genetic material due to culling of affected cattle.

Hidden Costs

- Discomfort and blindness leads to reduced grazing time.
- Decreased average daily weight gain[2,6] (ADG reduced by up to 10%[5,7]).
- Negative effects on fertility[7].
- Decreased milk production due to reduced dry matter intake.
- Stud animals and young stock – reduced sale price/removal from sale[6].
- True cost of pinkeye is probably understated.
- Many farmers don't treat clinical pinkeye cases due to the risk of spread being increased by yarding animals[4].

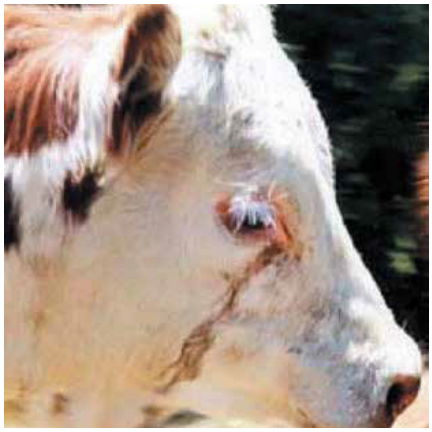
The animal welfare implications are also significant, as pinkeye is a common cause of pain and discomfort.

PREDISPOSING FACTORS FOR THE DEVELOPMENT OF PINKEYE[4,5,6]

- **Flies** – responsible for the spread of bacteria between animals.
- **Ultraviolet light** – sensitises and can damage the cornea.
- **Long grass** – causes physical damage and can cause mechanical transmission.
- **Dust** – irritates eyes, increases tear production and assists spread.
- **Pigmentation** – pinkeye is generally more common in non-pigmented eyes.
- More common in ***Bos taurus*** than ***Bos indicus*** cattle.
- **Overcrowding** – (e.g. cattle congregating for drought feeding, yard weaning).
- **Immune status** – cattle in poor body condition and/or under nutritional stress due to dry/drought conditions tend to be less able to mount a protective immune response against the bacteria. Prior exposure leads to immunity, hence disease is more common in young stock. Adult stock are still susceptible if they have not been previously infected. Herd outbreaks were observed in Tasmania when the disease was first introduced.

CLINICAL SIGNS OF PINKEYE[4,5]

- Increased **lacrimation** (increased tear production) is often the first sign seen.



- The cornea becomes **cloudy** and a **white spot** can appear in the centre

- Some cases clear at this stage but others progress to **corneal ulceration** and the cloudiness covers the whole cornea.

- The eye changes from a white to a **pink** to a **yellow** colour.

- Some of these eyes will return to normal following treatment, some will resolve with no treatment, some develop a small white scar and other are left **permanently blind**.

TREATMENT[4,5]

- **Eye ointment** – often works in the early stages of the disease.
- **Antibiotic injections** – several are registered for treatment of pinkeye.
- **Patches** – glued on to cover the eye and protect it from dust, flies and ultraviolet light after treatment.

A pinkeye patch applied to the eye of a Hereford calf after treatment for pinkeye

- **Surgery** – sometimes required to remove the eye if it ruptures, or to suture the eye closed after treatment.

PREVENTION[4,5]

- Historically in Australia, prevention of pinkeye has centred on management factors to limit fly numbers and to limit the exposure of susceptible cattle to dusty conditions and infected animals. With the introduction of **Piliguard** these husbandry factors are still important but the cattle producer has another weapon in the fight against pinkeye.
- **Vaccinate animals with Piliguard 3-6 weeks before the onset of the pinkeye season**
- Use other management tools to control the spread of pinkeye in your herd:
  - **Fly control** – Integrated Pest Management incorporating the use of **Coopers Easy-Dose**.
  - **Treat** clinical cases early – this will decrease the number of infective bacteria in the herd and limit spread.
  - **Segregate** affected animals and try to avoid yarding them in **dry, dusty conditions** to minimise transmission to susceptible animals.

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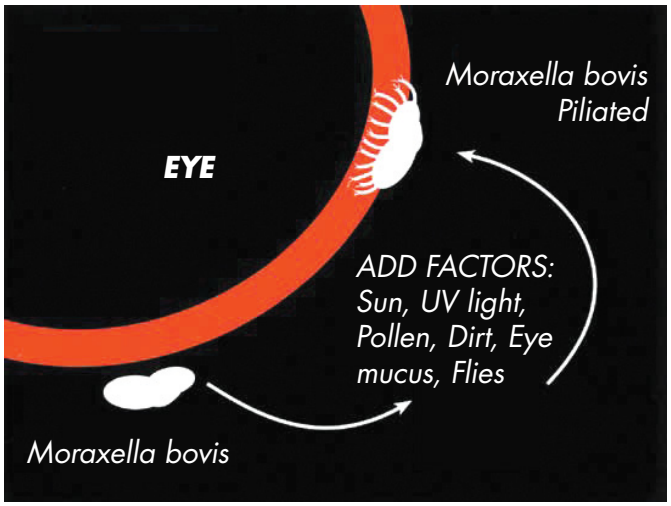
COOPERS PILIGUARD PINKEYE 1-TRIVALENT VACCINE

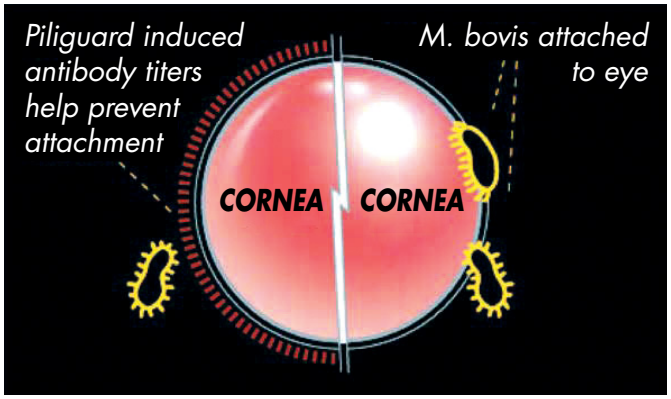
- The only commercially available vaccine against *Moraxella bovis* in Australia*.
- Formalin inactivated cultures of three *M. bovis* isolates (FLA64, SAH38, EPP63) in an oil emulsion adjuvant.
- Trivalent vaccine containing 3 strains of *Moraxella bovis* – provides cross protection against 64% of Australian field *M. bovis* isolates, which were identified on 77% of farms investigated for pinkeye outbreaks[2].

PILIGUARD MODE OF ACTION

- **Pili** are hair like structures on the surface of many bacteria – they aid attachment of bacteria to the surface of the cornea[2].



- Vaccination with **Piliguard**, which contains pilin antigen, blocks the attachment of bacteria to the cornea and prevents establishment of infection.



DOSE RATE AND ADMINISTRATION

- A single 2 mL dose is given by subcutaneous or intramuscular injection to all classes of cattle. For practicality, subcutaneous injection is recommended.
  - The mineral oil adjuvant acts as a depot at the local and regional lymph nodes.
  - Prolonged antigenic exposure stimulates a primary and secondary response with one injection.
- Inject into the side of the anterior third of the neck.
- Animals should be vaccinated 3-6 weeks before the onset of the expected pinkeye season.
- Calves as young as 2 weeks of age can be vaccinated.
- Piliguard is recommended to be administered with the Instrument Supplies 2 mL Ultimate BMV Vaccinator or a standard cattle vaccine applicator with a vented draw-off tube.

PILIGUARD VACCINATION SCHEDULE

Piliguard can be used in all classes of beef and dairy cattle. As pinkeye is much more prevalent in younger cattle and during the warmer months, the following vaccination guidelines are recommended:

DAIRY CATTLE	
CALVES	**Calves** Vaccinate all calves (>2 weeks of age), 3-6 weeks prior to the expected onset of the pinkeye season.
HEIFERS	**Replacement heifers** Vaccinate 3-6 weeks before the expected onset of the pinkeye season.
NAIVE HERDS	**Naive herds and high value stud animals** In pinkeye naive herds and high value stud animals, vaccinate all adult cattle, as well as young stock 3-6 weeks prior to the expected onset of the pinkeye season.

BEEF CATTLE	
SPRING CALVING	**Spring calving herds** Vaccinate calves 3-6 weeks before the onset of the pinkeye season. In many southern herds the most convenient time to do this would be at calf marking (October).
AUTUMNCALVING	**Autumn calving herds** Vaccinate calves 3-6 weeks before the onset of the pinkeye season. If yard weaning is practised it will be essential to have vaccinated calves at least 3-6 weeks prior to weaning, to aid in the prevention of pinkeye after weaning.
HEIFERS	**Replacement heifers (all herds)** Vaccinate 3-6 weeks before the expected onset of the pinkeye season.
NAIVE HERDS	**Naive herds and high value stud animals** In pinkeye naive herds and high value stud animals, vaccinate all adult cattle, as well as young stock 3-6 weeks prior to the expected onset of the pinkeye season.

Note: There is great regional and seasonal variation in the occurrence of pinkeye in Australia – the above are general recommendations and the vaccination schedule should be tailored to suit individual properties, considering the pinkeye history on that property and in that particular geographical location. For best results ***it is very important that cattle are vaccinated 3-6 weeks before the expected onset of the pinkeye season****.*

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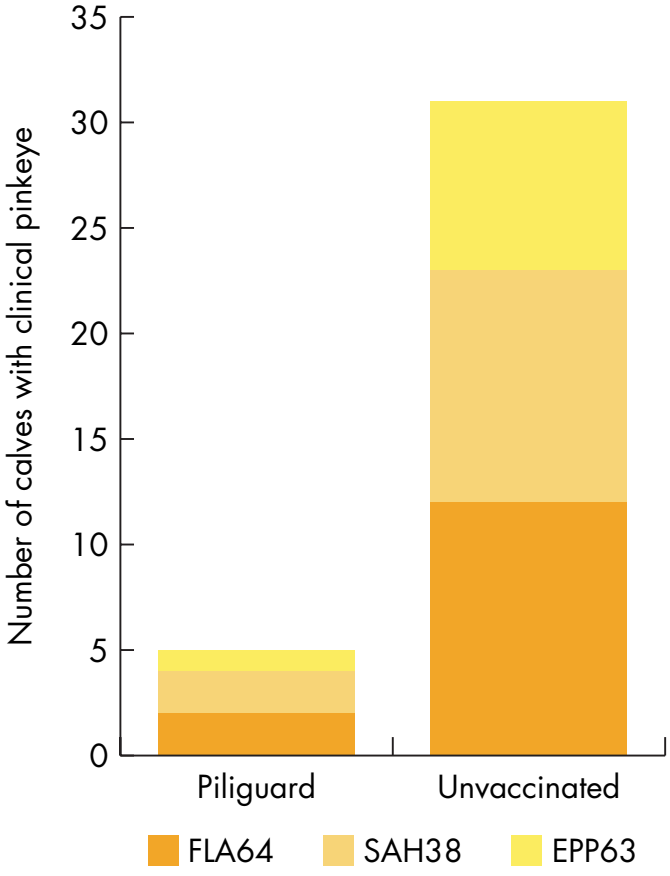
EFFICACY AND SAFETY OF PILIGUARD

- **Coopers Piliguard Pinkeye 1-Trivalent Vaccine** has been available internationally for over 25 years and in Australia for 10+ years and the safety and efficacy of the vaccine is accepted worldwide.
- Being and oil adjuvanted vaccine, a transient local reaction can sometimes occur at the injection site – this reaction should subside over a period of 2-6 weeks.
- The **efficacy** of Piliguard has been shown internationally by controlled challenge of vaccinated calves[9].
- In 1990, a challenge study was performed to determine the efficacy of a single dose 3 strain *Moraxella bovis* vaccine[9].
- 94 calves were used in the study – 45 vaccinated and 49 unvaccinated controls. Calves were separated into groups and then exposed to one of the three strains of *M. bovis*.
- Across these groups only 5 out of the 45 vaccinated calves developed clinical signs of pinkeye, whereas in the unvaccinated calves 30 out of the 49 calves developed clinical signs.
- The study concluded that a single dose 3 strain *Moraxella bovis* vaccine provided significant protection against *M. bovis*.
- Coopers Piliguard Pinkeye 1 -Trivalent Vaccine has been shown to be relevant to the local Australian strains of *M. bovis* by in vitro immunogenic correlation[2] and through the efficacy results over the last 10 years of use in Australia.
- After extensive international use for over two decades, there is no evidence to indicate that the administration of **Coopers Piliguard Vaccine** adversely affects reproductive performance.

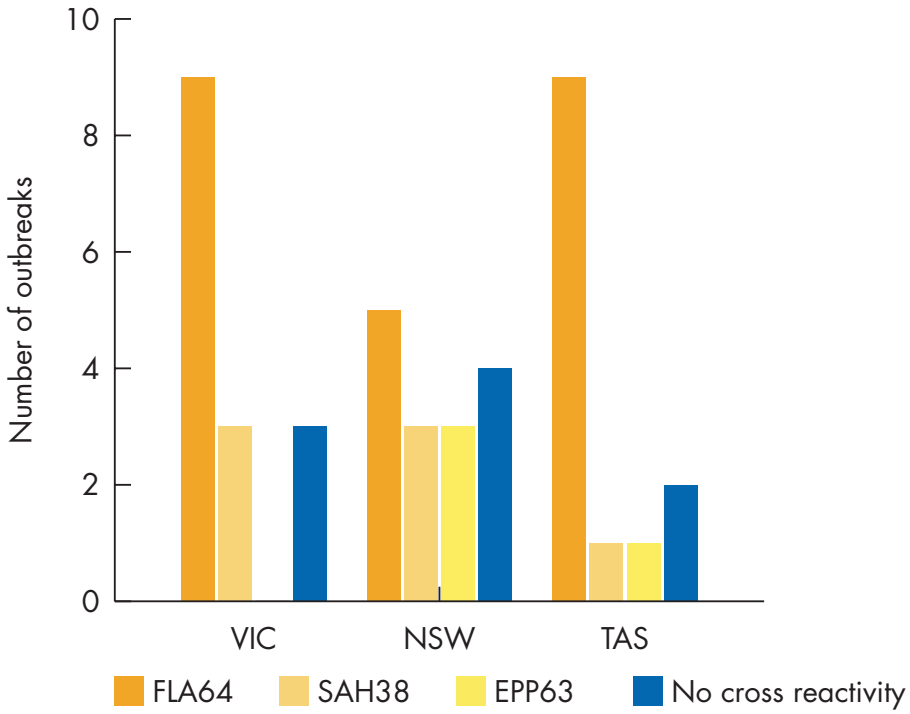


CROSS-REACTIVITY OF AUSTRALIAN ISOLATES OF *MORAXELLA BOVIS* WITH THE STRAINS CONTAINED IN THE PILIGUARD VACCINE

There have been a number of strains of ***M. bovis*** identified as being important in causing pinkeye in Australian cattle. **Coopers Piliguard Pinkeye 1-Trivalent Vaccine** is a one dose trivalent vaccine against three strains of *M. bovis*. These strains are referred to as ***Moraxella bovis* FLA64, SAH38 and EPP63**.

In 2003, twenty-five veterinary practices located throughout the intensive cattle producing regions of Australia participated in a study whereby ocular swabs were collected from cattle with pinkeye[2]. From these swabs, 70 *M. bovis* samples were attained, representing pinkeye outbreaks on 44 properties. In 34 (77.27%) of these outbreaks, the *M. bovis* isolated cross-reacted with one of the strains in the Piliguard vaccine, with '64% of *M. bovis* isolates demonstrating pili antigens with one of the three vaccinal strains' (FLA64, SAH38 and EPP63)[2].

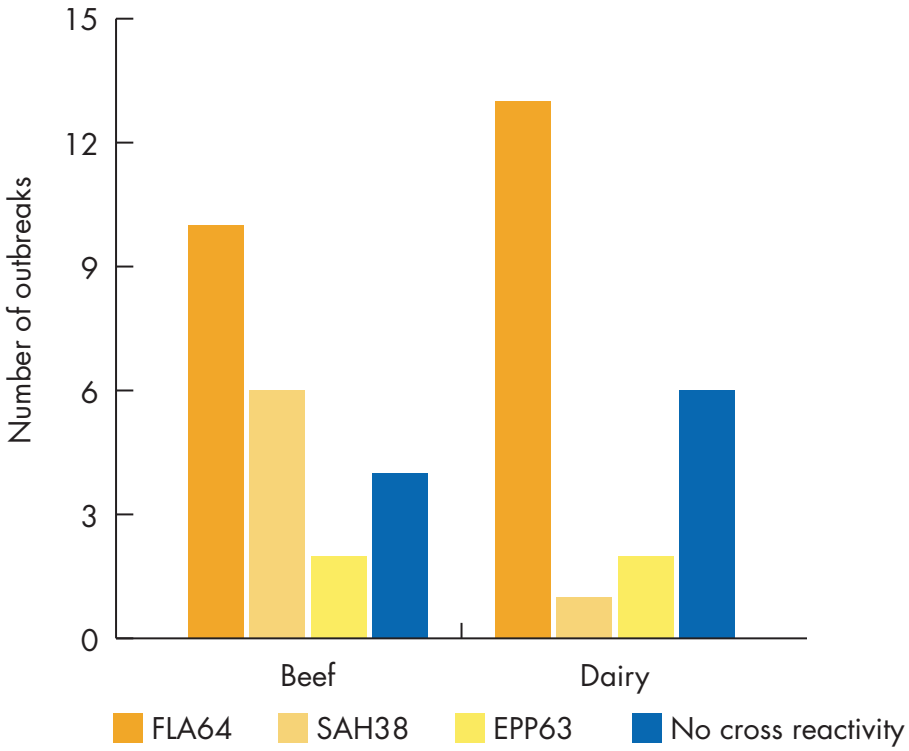
Serologic cross-reactivity of *M. bovis* isolates (from each outbreak by state of origin) with the strains contained in Piliguard[2]



Note: swabs submitted from Western Australia and Queensland frequently grew a mixed growth of bacteria, presumably reflecting overgrowth due to prolonged shipping times.

CROSS-REACTIVITY OF AUSTRALIAN ISOLATES OF *MORAXELLA BOVIS* WITH THE STRAINS CONTAINED IN THE PILIGUARD VACCINE (continued)

Serologic cross-reactivity of *M. bovis* isolates (from each outbreak by type of animal production) with the strains contained in Piliguard[2]



The study concluded that a pinkeye vaccine containing these strains of *M. bovis* would provide a management tool to minimise infection and decrease the detrimental effects in the majority of Australian pinkeye outbreaks in both beef and dairy cattle[2].

Coopers Piliguard Pinkeye 1-Trivalent Vaccine is the first commercially available pinkeye vaccine in Australia and provides an aid in the prevention of pinkeye associated with infection by strains of *Moraxella bovis* expressing pili similar to those used in the vaccine.

PREVENTION IS BETTER THAN TREATMENT FOR PINKEYE

Vaccination has a number of advantages over current treatment methods for pinkeye:

- Vaccination reduces the **incidence** and **severity** of the disease[2,10,11], reducing individual animal suffering and production losses.
- Pinkeye is often **well advanced** before animals are treated and as such animals often don't respond well to treatment.
- Vaccination reduces the need for antibiotics[2] and therefore reduces the risk of bacterial resistance or residues.
- Vaccination can be administered at **convenient** times (e.g. drenching, calf marking) when animals are being mustered.
- Vaccination reduces the need for **yarding cattle** in hot, dusty conditions to treat affected animals, thus reducing risk of further spread of pinkeye[4].
- Animal wellbeing[2,9].

OCCUPATIONAL HEALTH AND SAFETY

- Extreme caution should be used when injection oil emulsion vaccines to avoid injecting yourself.
- Accidental self-inoculation can cause a serious local reaction.
- Contact a doctor immediately if self-inoculation occurs and take the package carton with you.

STORAGE

- Store at 2-8 degrees Celsius (refrigerate, do not freeze).
- Use all product immediately after opening.

PACKAGING

- Coopers Piliguard is available in 100 mL (50 doses) and 20 mL (10 doses) vials.

WITHHOLDING PERIODS

- Meat: Zero (0) days.
- Milk: Zero (0) days.
- ESI: Zero (0) days.

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FURTHER INFORMATION

For further information on Coopers Piliguard Pinkeye 1-Trivalent Vaccine or any other Coopers products, please contact your local Coopers Animal Health representative or contact Coopers Animal Health Customer Service on Toll Free 1800 226 511.

Please visit our website at:

www.coopersanimalhealth.com.au

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* Correct of date of publication, Oct 2019.

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