A single vaccination at 21 days of age provides early and long lasting protection for up to 26 weeks.

Contains the highly potent Ceva proprietary strain BA 2940-99

Imuvant™, a unique Ceva adjuvant containing a non-toxic LPS from J5 *E. coli*

Ceva Lung Program expertise and support with its Lung Scoring Methodology.

**Enzootic Pneumonia Protection**

<table>
<thead>
<tr>
<th>Species</th>
<th>Administration Route</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pigs for fattening</td>
<td>IM</td>
<td>2ml from 21 days of age</td>
</tr>
</tbody>
</table>

**ACTIVE SUBSTANCE:** Bacterial Lipopolysaccharide derived from Mycoplasma hyopneumoniae strain BA 2940-99. **CONTRAINDICATIONS:** None. **SPECIAL PRECAUTIONS FOR USE IN ANIMALS:** Vaccinate only healthy animals. **SPECIAL PRECAUTIONS TO BE TAKEN BY THE PERSON ADMINISTING THE VETERINARY MEDICINAL PRODUCT TO ANIMAL:** To the User: The veterinary medicinal product contains mineral oil. Accidental injection/self injection may result in severe pain and swelling, particularly if injected into a joint or finger, and in rare cases could result in the loss of the affected organ. If prompt medical attention is not given, if you are accidentally injected with this veterinary medicinal product, seek medical attention immediately. **INTERACTION WITH OTHER MEDICINAL PRODUCTS AND OTHER FORMS OF INTERACTION:** No information is available on the safety and efficacy of this vaccine when used with any other veterinary medicinal products. Consult a veterinarian before using any other veterinary medicinal product. A decision to use this vaccine before or after any other veterinary medicinal product therefore needs to be made on a case by case basis. **AMOUNT(S) TO BE ADMINISTERED TO AND ADMINISTRATION ROUTE:** For intramuscular use. Vaccinate pigs in the side of their neck. Administer a single dose of 2 ml from 3 weeks of age.

**USE DURING PREGNANCY, LACTATION OR LAY:** Not applicable. **OVERDOSE (SYMPTOMS, EMERGENCY PROCEDURES, ANTIDOTES) IF NECESSARY:** Not applicable. **AROMA FOR EACH TARGET SPECIES:** Pigs for fattening. **WITHDRAWAL PERIOD(S):** Zero days. **LEGAL CATEGORY:** UK: POM-V IE: POM-V

Further information is available on the SPC

Further information is available from: Ceva Animal Health Ltd
Unit 3, Anglo Office Park, White Lion Road, Amersham, Bucks HP7 9FB
Tel: 01494 781510 www.ceva.co.uk

Use medicines responsibly (www.noah.co.uk/responsible)
Enzootic Pneumonia Protection
Mycoplasma hyopneumoniae: a real economic problem for pig farmers

*Mycoplasma hyopneumoniae*, associated with enzootic pneumonia, plays a major role in the porcine respiratory disease complex (PRDC) and can cause huge economic losses. A 17% decrease in daily weight gain and a 14% decrease in feed efficiency in herds with enzootic pneumonia has been reported.

*Mycoplasma hyopneumoniae* is unable to penetrate and live within host cells but does colonise the mucosal surface of the ciliated epithelium of the respiratory system. In addition to the detrimental effect on the cilia, *Mycoplasma hyopneumoniae* infection attracts lymphocytes and macrophages into the lungs resulting in pneumonia. Protection against the infection requires complex activation of the host immune system.

**Hyogen®**: protect your pigs against *Mycoplasma hyopneumoniae*

After a single injection, Hyogen® provides effective protection against *Mycoplasma hyopneumoniae* due to the potent stimulation of the immune system by the antigen originated from Ceva *Mycoplasma hyopneumoniae* strain BA 2940-99 along with the adjuvant, Imuvant™.

**Ceva proprietary strain BA 2940-99**: To determine the best option, for a new vaccine, Ceva has decided not to use the old J strain and undertook research to find a circulating virulent strain reflecting current field situation. The lab has also worked on proteomic and antigenic characterisation of the strain to induce high level of immunity.

**Imuvant™ is a unique Ceva adjuvant** composed of a non-toxic lipopolysaccharide (LPS) from J5 *E. coli* together with a mineral oil in water emulsion that forms a complex and highly efficient immunostimulant. This stimulation is due to the oil in water formula acting as a direct delivery system, which promotes the uptake of antigen by Antigen Presenting Cells (APC). At the same time, the LPS component of Imuvant™ stimulates the innate immune system while simultaneously enhancing the specific response to mycoplasma antigen via B and T lymphocyte activation pathways.

**Stimulation of the immune system with Imuvant™**
Cell Mediated and Humoral Immunity

**Cellular Immunity**  Hyogen® vaccinated pigs had a significantly higher mean *Mycoplasma hyopneumoniae* specific, IFN-γ producing, white blood cell counts as compared to the controls.6

Mean Number of Antigen Specific White Blood Cells / 6 log 10 Peripheral Blood Mononuclear Cells

<table>
<thead>
<tr>
<th></th>
<th>Day 13 after vaccination</th>
<th>Day 90 after vaccination</th>
<th>Day 175 after vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyogen® Vaccinated</td>
<td>23.75</td>
<td>25.31</td>
<td>10.38</td>
</tr>
<tr>
<td>Control</td>
<td>0.56</td>
<td>1.64</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Humoral Immunity**  Hyogen® also elicits a significant early and long lasting antibody response after vaccination as demonstrated in both onset of immunity and duration of immunity studies.6

Mean Antibody Titer Post Vaccination (EU/ml)

<table>
<thead>
<tr>
<th></th>
<th>Day 0</th>
<th>Day 15 after vaccination</th>
<th>Day 0</th>
<th>Day 175 after vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyogen® Vaccinated</td>
<td>Negative</td>
<td>2.4</td>
<td>Negative</td>
<td>6.1</td>
</tr>
<tr>
<td>Control</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Study 1

Study 2
IMUVANT™ INCREASES THE DEFENCE OF PIGS VACCINATED WITH HYOGEN® AGAINST MYCOPLASMA HYOPNEUMONIAE

PROTECTION FROM

17 days POST VACCINATION

In a clinical trial seronegative 3 week old pigs were either vaccinated with Hyogen® or served as non-vaccinated controls. All animals were challenged with *Mycoplasma hyopneumoniae* day 17 and 18 post vaccination, and euthanised and necropsied on day 46. Hyogen® vaccinated animals had 19.9 times lower lung scores than the non-vaccinated controls (p= 0.0028).

PROTECTION UNTIL

26 weeks POST VACCINATION

Seronegative pigs were vaccinated with Hyogen® at three weeks of age or served as non-vaccinated controls. 26 weeks after vaccination both groups were challenged with a virulent strain of *Mycoplasma hyopneumoniae* and 4 weeks later were euthanised and necropsied. Hyogen® vaccinated animals had 14.32 times lower lung scores than the non-vaccinated controls (p=0.0001).

IN THE FIELD

Hyogen: Visible Difference

Protection of lungs

In a field study involving a sample of piglets on a farm where *Mycoplasma hyopneumoniae* was present, pigs were vaccinated at three weeks of age with either Hyogen®, a competitor *Mycoplasma hyopneumoniae* bacterin or a placebo. Hyogen® vaccinated pigs had statistically significant lower lung scores at slaughter. Hyogen® is both efficacious in the face of *Mycoplasma hyopneumoniae* challenge in the field and provides significantly better protection than a competitor vaccine.
Hyogen® is part of the Ceva Lung Program. The Ceva Lung Program provides an overview of the diseases associated with Actinobacillus pleuropneumoniae and Mycoplasma hyopneumoniae.

It offers the methodology and guidelines on how to correctly evaluate the presence, incidence and circulation patterns of these diseases. Looking at the impact of these infections using serological investigation and an adapted lung scoring of slaughter pigs, it is used to determine the appropriate vaccination protocol and monitor the results of vaccination with Coglapix® and Hyogen®. The program is supported by key opinion leaders and is an asset for building Ceva’s reputation as experts in respiratory health.

An iPad and Android application to aid effective lung scoring at the slaughterhouse.

The CLP App is available from: [App Store] or by scanning: [QR Code]
Evaluation of pneumonia and pleurisy

Pneumonia and pleurisy can be evaluated in a qualitative and quantitative manner. In the Ceva Lung Program, pneumonia is scored based on the Madec method, which has been modified considering the contribution of each lobe to the overall capacity of the lungs. Quantification of scarring is included. Pleurisy is scored using the Slaughterhouse Pleurisy Evaluation System (SPES) method, although in the Ceva Lung Program only cranial pleurisy is recorded separately as Cranial Pleurisy Scoring. Dorso-causal pleurisy (associated with Actinobacillus pleuropneumoniae infection) is assessed separately and this score is used to calculate the APPI (Actinobacillus Pleuropneumoniae Index).

Modified Madec Scoring

For the modified Madec score, the enzootic pneumonia-like lung lesions of each lobe are quantified according to the following:

<table>
<thead>
<tr>
<th>Surface of the lobe affected</th>
<th>Score 0</th>
<th>Score 1</th>
<th>Score 2</th>
<th>Score 3</th>
<th>Score 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No lesions</td>
<td>0</td>
<td>1-25 %</td>
<td>26-50 %</td>
<td>51-75 %</td>
<td>76-100 %</td>
</tr>
</tbody>
</table>

Since each lobe does not represent an equal proportion of the lung, the following weightings were assigned according to Christensen (1999)\(^1\).
Cranial pleurisy can be attributed to pathological processes in this area which are likely related to *Mycoplasma hyopneumoniae* and other respiratory pathogens such as SIV, *Pasteurella multocida* and other bacteria. This cranial pleurisy should be recorded separately from the dorso-caudal pleurisy to allow the appropriate differential diagnosis. These lesions include pleurisy on the surface of the lung lobes or between lobes as interlobar pleurisy. Pleurisy in the apical and cardiac lung lobes are scored as follows:

**Score 0 :** No pleurisy in apical and cardiac lung lobes  
**Score 1 :** Pleurisy in apical and cardiac lung lobes

The presence of fissures or scarring is recorded. Fissures are evidence of old infections likely due to *Mycoplasma hyopneumoniae*

**Score 0 :** Absence of fissures (scarring)  
**Score 1 :** Presence of fissures (scarring)