Defining, Preventing, and Treating Anoestrous Condition in Cattle
ReprodAction meeting:
Defining, Preventing, and Treating Anoestrus Condition in Cattle

Ceva Santé Animale organised the first ReprodAction Scientific Meeting with a renowned group of researchers on the field of cattle reproduction. The meeting was held on May 3rd and 4th 2012 at the Grand Hôtel de Bordeaux (France).

The main objective of the meeting was to create an environment for open exchange of ideas and science-based discussion among experts on a specific reproductive topic: “Defining, Preventing, and Treating Anoestrus Condition in Cattle”.

Data from different countries and management conditions was presented by participating experts. The proposal was to have a broad understanding of the anoestrus problem in different production systems.

The contents of this short review do not represent the opinion of a single expert, but rather includes a summary of opinions from different experts participating in the meeting. We encourage the reader to communicate directly with the expert of its interest for further details on their particular line of research and individual points of view regarding the topics that will be covered in this manuscript.
The group attending the scientific meeting

From left to right:

**Front row**, Pedro Rodríguez (Ceva Corporate Product Manager), Maykin Englebienne (Ceva Product Manager/Benelux), Prof. Hilary Dobson (University Liverpool/UK), Gamze Alpun (Ceva Product Manager/Turkey), Anouck Lagarde (Ceva Project Manager), Prof. Nicole Hagen-Picard (Veterinary School of Toulouse/France). **Mid row**, Antonio Jimenez (Ceva Product Manager/Spain), Giorgio Valla (Ceva Marketing Manager/Italy), Tatjana Andres (Ceva Technical Manager/Germany), Clare Turnbull (Ceva Veterinary Advisor/UK), Prof. Geert Opsomer (University of Ghent/Belgium), Alex Souza (Ceva Corporate Reproduction Manager), Prof. Ahmet Gumen (University of Uludag/Turkey), Prof. Jose Santos (University of Florida/USA). **Rear row**, Rafal Trukan (Ceva Product Manager/Poland), Prof. Tomasz Janowski (University of Warmia and Mazury/Poland), Dr. Giovanni Gnemmi (Bovinet/Italy), Martin Gough (Ceva Ruminant Business Unit Manager/UK), Stephane Floch (Ceva Product Manager/France), Prof. Heinrich Bollwein (University of Zurich/Switzerland), Prof. Fernando Lopez-Gatius (University of Lleida/Spain).
DEFINING
Anoestrous Condition in Cattle

During the reprodAction meeting, the group of specialists agreed that the term “anoestrous” refers to cows either not showing or simply not been detected in oestrus due to management constraints (Roelofs, López-Gatius et al. 2010). The specialists and vets in the meeting were also in agreement that, in a veterinarian standpoint, the term “non-cyclic” rather than “anoestrous” seem to better describe and define the problem of having cows failing to ovulate and initiate regular oestrous cycles of nearly 21 days. Most experts agreed that the use of ultrasound significantly improves the accuracy of detection of ovarian/uterine disorders. Therefore, since expression of oestrus appears to be highly variable from herd to herd, obviously dependent on the farmer’s performance in detecting cows showing behavioural oestrus, and affected by several other environmental factors such as heat stress, feet problems, etc; a more simple definition based mainly on characteristics of the ovary and uterus was proposed to help field veterinarians and producers, as follows:

**Non-cyclic Type 1:** Cows or heifers presenting small (smaller than deviation size) ovarian follicles and absence of a Corpus Luteum (CL) structures for at least 7 to 10 days and normally not showing oestrus behaviour.

![Ultrasound images of ovaries of cows presenting non-cyclic Type 1](image1)

*Figure 1.* Ultrasound images of ovaries of cows presenting non-cyclic Type 1 (left – presence of small follicles <10 mm), Type 2 (centre and right pictures, presence of follicles greater than 10 mm -centre- or even greater than 25 mm -right – classical follicular cyst).
Non-cyclic Type 2: Cows or heifers presenting larger follicles (greater than deviation size including classical large cystic condition) and absence of CL structures for 7 to 10 days with or without demonstration of oestrus behaviour.

Non-cyclic Type 3: A third classification of non-cyclicity due to abnormally prolonged ovulatory intervals was proposed as caused by persistent CL structures (Opsomer, Gröh et al. 2000); problem commonly associated to uterine infection and/or inflammation. The CL structure seems to persist in these animals longer than their normal lifespan due to alterations in the normal mechanism related to luteolysis. The definite diagnosis of this reproductive abnormality in field conditions is rather complex and would require multiple and frequent ultrasound examinations or a complete profile of circulating progesterone throughout several weeks. Thus, under field conditions, cows in the postpartum period having uterine disorders such as (i.e.) presence of muco-purulent or purulent uterine contents and a mature CL might likely have persistent CLs.

Figure 2. Ultrasound images of ovaries of cows classified as Non-cyclic Type 3. Presence of a persistent CL (far-left) normally associated with uterine disorders such as muco-purulent (middle) and purulent (far right) contents.
The ovulatory process in cattle encompasses a complex sequence of events during the later stages of the oestrous cycle that involves rise in circulating oestrogen due to high steroidogenic activity of pre-ovulatory follicles, causing behavioural oestrous, positive feed-back of oestrogen on the hypothalamus and anterior pituitary to release LH/FSH,
and ultimately ovulation of the oocyte followed by luteinisation of remaining cells in the follicle to form the new CL. The normal sequence of these events as well as the underlying proposed physiology of animals undergoing non-cyclicity Types 1 and 2 are represented in the following working models below:

*Figure 4.* Representation of main reproductive hormone cascade and ovarian structures during the oestrous cycle in non-cycling cows. On the left, **Non-cyclic Type 1**, follicles are unable to grow to pre-ovulatory size due to limited supply of GnRH/LH pulses. The ovulatory cascade is then interrupted before or near deviation time. On the right, **Non-cyclic Type 2**, low amounts of LH pulses do not seem to be a problem and dominant follicles seem to be able to grow after deviation size threshold and produce enough oestrogen, however the hypothalamus is unable to respond with a GnRH/LH surge after the pre-ovulatory oestrogen increase and ovulation does not occur. Follicles eventually may grow enough (>25 mm) to be called follicular cysts. Source (Wiltbank, Gümen et al. 2002) with permission from authors.
SYNCROSTIM 500 IU lyophilisate and solvent for solution for injection for cattle and sheep. Reconstituted solution for 1 dose of 2 ml contains: Equine serum Gonadotrophin (eCG, formerly known as PMSG) 500 IU. Benzyl alcohol 33.0 mg/Indications for use: In non-cycling cattle (cows and heifers) and in ewes and ewe-lambs: Induction and synchronization of oestrus and ovulation. To be used in combination with a progestagen/Intramuscular use/Withdrawal period(s): Meat and offal: zero days. Milk: zero days. CYSTORELIN/OVARELIN 50 µg/ml, solution for injection for cattle/Composition for 1 ml: gonadorelin (as diacetate tetrahydrate) 50.0 µg, Benzyl alcohol 15.0 mg/Indications for use: Treatment of delayed ovulation (repeat breeding)/Intramuscular use/100 µg of gonadorelin (as diacetate) per animal in a single injection. i.e. 2 ml of the product per animal/Withdrawal period(s): Meat and offal: zero days. Milk: zero hours. ENZAPROST 5 mg/ml Solution for injection for cattle/Each 1 ml contains: Dinoprost (as trometamol) 5 mg. Excipients: Benzyl alcohol (E1519) 16.5 mg/Indications for use: The product is indicated for its luteolytic effects in cattle./Pregnancy status should be determined prior to injection since Dinoprost has been demonstrated to result in abortion or parturition induction when administered at sufficiently high doses in many animal species/Intramuscular use./Withdrawal period(s): Meat and offal: 3 days. Milk: zero hours. PRID DELTA 1.55 g vaginal delivery system for cattle/Each delivery system contains: 1.55 g of progesterone, Ethyl Vinyl Acetate (EVA), Polyamide, Polyester string/Indications for use: For the control of the oestrus cycle in cows and heifers including Synchronisation of oestrus in cycling and non-cycling cattle. To be used in combination with a prostaglandin and equine Chorionic Gonadotropin (eCG, in the past called PMSG)/Vaginal use: 1.55 g of progesterone per animal for 7 days/ Timing of insemination: Animals should be inseminated 56 hours after removal of the device/Withdrawal period. Meat and offal: zero days. Milk: zero days.

Indications featured here reflect the licensing conditions comprised in the International products SPC and may not reflect the license conditions in individual countries. For more information about the specific use of this product refer to the SPC of your country.