

# The use of ultrasound in the rearing of quality heifers

by John Dawson MRCVS, Director, Embryonics Ltd, Station Road, Weaverham, Cheshire CW8 3PY, UK.

With heifer rearing typically costing 20% of the farm budget and around 3.5p per litre of milk across its lifetime production, the importance of rearing high quality heifers free from problems is essential.

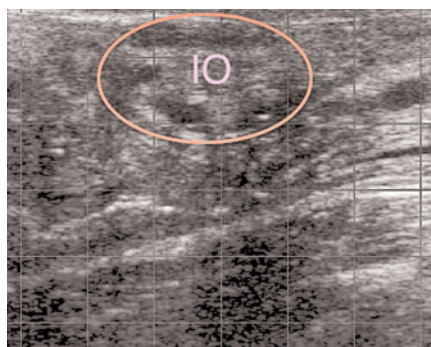
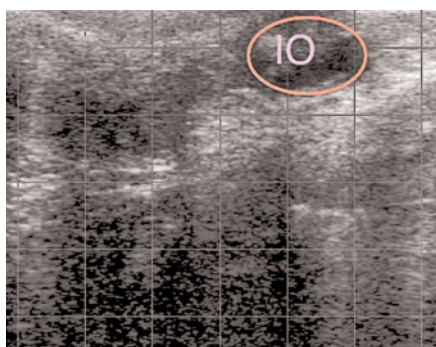
A comprehensive management plan incorporating all of the technological advances of heifer rearing will allow producers to realise their full potential.

Many tools are available when rearing and purchasing to help ensure high quality, high producing young stock. Ultrasound is one such tool, with benefits throughout the heifer's life to aid in the diagnosis of life-threatening or production-impeding conditions.

In addition it can be utilised to examine their quality when purchased. Examples of when it can be used to its full potential during the adolescent period include differential diagnoses of umbilical swellings, diagnosing heart conditions, establishing whether there has been previous lung damage, and assessing the quality of teat and mammary development.

There is also recent research with encouraging results to indicate its potential to determine the udder size and the milk potential of the heifer. This article explores the use of ultrasound in aiding reproductive efficiency in greater detail.

**Fig. 1. An inactive ovary from a genetic anoestrus (IO) is outlined. No follicles are seen.**



**Fig. 2. Inactive ovary from an immature heifer (IO) is outlined. Follicles are seen in the perimeter of the ovary signifying activity.**

## Reproduction

Ultrasound is used to aid diagnosis of reproductive status, with subsequent superior treatments increasing conception rates.

Great benefits are gained from using ultrasound during the examination to maximise fertility in the heifer during the pre-breeding examination, making an important contribution to successful conception, especially when used in conjunction with synchronised fertility programs.

Examination just prior to breeding is performed so that any defective reproductive organs can be detected and the reproductive state established.

Defective reproductive organs includes the absence of parts of the reproductive tract which occurs when 'freemartinism' (mixed twins) or other genetically-induced impairments of the genital tract's development occur.

## Inactive ovaries

Inactive ovaries can signify two states of anoestrus in the heifer:

- The inactive, anoestrus state can be due to a genetic disorder rendering them infertile and unable to breed. The ultrasound image in these cases shows very small ovaries with no evidence of structural

activity. These ovaries are very difficult to find and visualise (Fig. 1). These heifers will never breed.

- The inactive, anoestrus state can be due to lack of maturity. This immaturity is the result of a late-developing heifer. The heifer is the correct age and size, but it becomes reproductive at an older age. When diagnosed in individual animals they can be switched to the younger group where they will be re-examined once reproductive activity has started.

The immaturity can also be due to poor or incorrect nutritional input into the heifer. In this case anoestrus is seen as a group problem with a large percentage of the heifers affected. The ovaries in these cases are also small and difficult to visualise, but do show some activity in the form of small follicles ranging from 3-5mm in diameter (Fig. 2).

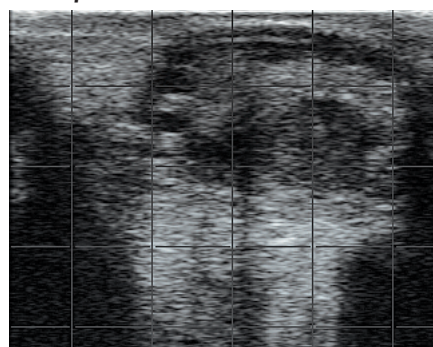
These, however, lack a mature corpus luteum or follicles. Heifers with this type of inactivity (anoestrus) require more time to mature, and the nutritional input of the group needs to be adjusted.

A similar state of the ovaries, and subsequent ultrasound images, occurs when the heifer has just been bulling and therefore care has to be taken to scan the whole reproductive tract when identifying these anoestrus heifers.

The heifer which has just been bulling has evidence within the lumen of the uterus

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**Fig 3. This sub-active ovary contains a small corpus luteum. Additional hormone treatment is required to aid conception.**



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which differentiates them from the anoestrus state. A thorough examination of the tract, including the uterus, avoids the misdiagnosis.

## Sub-active ovaries

Sub-normal ovarian activity can be identified, and appropriate additional treatment given. The ultrasound images in these heifers show the presence of hormone-producing structures, but these are either too small or too numerous.

These sub-active ovaries have corpora lutea which are between 0.5-1.5cm compared with 1.5-2.5cm in fully functional, normal ovaries (Fig. 3).

These heifers therefore require the addition of progesterone to aid conception. Other sub-active heifers have large numbers of follicles present, usually in the size range of 7-12mm but in the absence of any luteal tissue. These cases can be treated with hormonal programs which include eCG and progesterone to increase conception rates.

At the time of the ultrasound examination these heifers can be fully assessed for their body condition, coat condition and their cardiovascular system.

## Overactive ovaries

Overactive reproductive activity, known as the cystic ovarian condition, can also be assessed and treated appropriately. Cystic ovarian structures are essentially structures which are too large or too numerous leading to prolonged periods of hormone production, sometimes combined with abnormally high hormone levels.

There are two types of cystic structures found in the heifer:

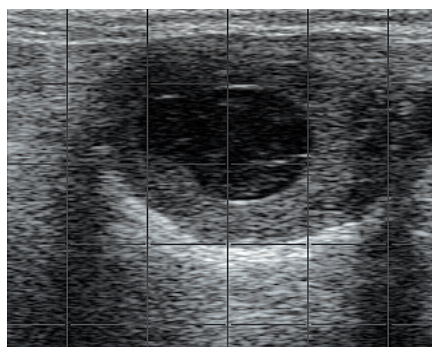
- **Luteal cysts:** The luteal cyst is a corpus luteum which is greater than 2.5cm in diameter and has a large central lacuna (Fig. 4). Treatment has a high success rate.

- **Follicular cysts:** The ultrasound image shows a follicular structure which is larger than 2.5cm in diameter (Fig. 5). The cystic state occurs when the follicle fails to ovulate. If the heifer is found to have a follicular cyst treatment has a very poor success rate.

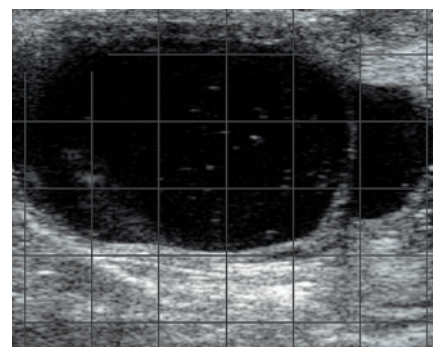
## Vaginal examination

The vaginal examination is of great benefit when diagnosing the status of the cow's reproductive cycle. Vaginal examinations which can be performed very easily in the cow are, however, very difficult in the heifer and should be avoided.

Ultrasound examination replaces the vaginal examination in the heifer because imaging is easier, and more detailed visualisation of the reproductive tract is achievable. In the heifer the accuracy of



**Fig 4. This luteal cyst is 3.5cm with a lacunae 1.75cm.**



**Fig 5. This follicular cyst is very large. These are usually untreatable.**

identifying, measuring and differentiating the subtle echogenic differences of the major structures makes diagnosis very accurate.

## Synchronising breeding

The most efficient method of breeding heifers is the use of a synchronisation programme. Synchronised breeding programmes make efficient use of time and labour during the insemination period.

The heifers can be calved in a tight group when most convenient. The tight group allows more attention to be given to them whilst calving and when they are introduced to the milking regime. Inclusion of the ultrasound examination at the start of the synchronisation program helps establish the reproductive health and status of the heifer group.

The information obtained from the ultrasound examination is used to identify the heifers with potential problems.

These heifers can either be eliminated from the synchronised group or treated with a modified hormonal programme to increase the conception rates. Identifying the heifer which is reproductively active, which is cycling efficiently and which is at the correct stage of ovulation when inseminated reduces semen wastage and increases the reproductive productivity of the heifer group.

The ultrasound machine has become a

routinely used veterinary instrument during the reproductive examination, and is a vital part of the pre-breeding check. Its use, along with the images produced, enhance and enable identification of the reproductive state. The detailed pictorial information confirms both the stage of the reproductive cycle of all animals, and identifies those in the abnormal state.

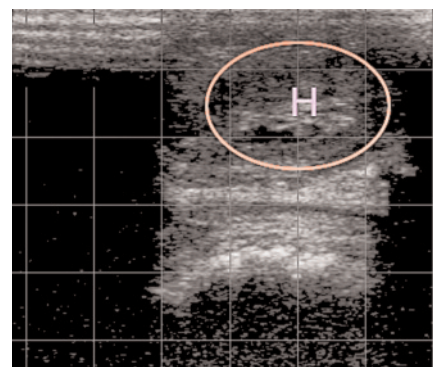
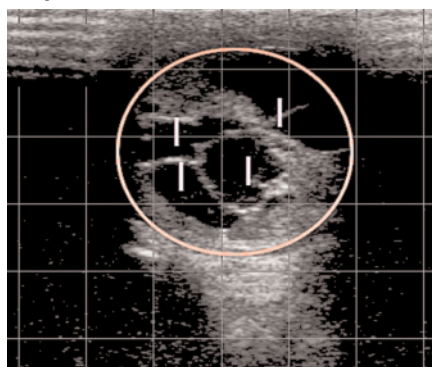
Aside from the reproductive examination ultrasound is also being used to image many other structures including the heart, lungs, udder and teat tissues and other soft tissue areas. An example where it can be of benefit when purchasing heifers is identifying previous lung damage.

## Umbilical swelling

Umbilical swellings are common in the young heifer and can be a serious problem. The swelling can have several forms including herniation, scarring and abscessation. Ultrasonography can help differentiate between these problems and aid the treatment choice required for their recovery. A hernia is diagnosed and reduction confirmed in Fig. 6.

The importance of rearing young stock to a high level has never been questioned and the quest for aid and guidance to help the successful growth, maturity and conception of the replacement heifer is an ongoing process. ■

**Fig. 6. The hernia (H) outlined contains loops of intestine (I). Left, before reduction of the hernia has taken place and, right, afterwards. No intestinal loops are seen as they have been returned to the abdomen.**



Images are taken by Easi-Scan, BCF Technology Ltd.