

MU Guide

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Swine Pregnancy Checking by Ultrasonic Sound

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Principles of Ultrasonic Sound

Ultrasonic sound waves of 2 or 2.5 megahertz can pass through living tissue. These sound waves are painless to the animals and have no harmful aftereffects to a fetus. Ultrasonic sound waves will not travel through air; consequently, air must be sealed out by using an appropriate sealant such as a non-detergent motor oil, Ky jelly, or other.

The transducer, which transmits and receives sound waves, is the essential part of the pregnancy detection instrument. It takes various shapes and positions on the rest of the unit. It may be attached permanently to the unit, or it may be attached by a shielded cable. The crystal in the transducer transmits and converts electrical energy into sound energy and passes it into the animal. When these sound waves encounter interfaces of tissues of different densities, such as skin, fat, lean, and connective tissue, sound waves bounce back to the transducer and convert back to electrical energy, which the instrument analyzes.

The returning signals can show whether an animal is pregnant. If the signals present are the ones the instrument is programmed to read as pregnant, the instrument shows this with a steady signal.

Pregnancy Detection

To aid in accurate pregnancy diagnosis, the instrument operator must know the anatomy of the animal and understand changes that take place inside the pregnant animal.

At the time of breeding, the uterus is located in the upper portion of the abdominal cavity and is suspended by a broad ligament. See Figure 1. Also, note the location of the urinary bladder.

After conception occurs, fluid accumulates in the uterus. The right uterine horn usually fills first. As the fluid increases in volume, the weight causes the uterine horn to drop through the intestines to the bottom of the abdominal cavity. This occurs at about 28 to 30 days after conception.

Seldom does the uterus drop before 28 days. Therefore, accurately diagnosing pregnancy earlier than 28 to 30 days is difficult.

Pregnancy is easily detected between 30 and 65 days gestation. At 30 to 65 days pregnant, the fetuses are very small in relationship to the volume of the uterine fluid and do not interfere with the ultrasonic sound waves. See Figure 2.

As the fetuses grow, they begin to interfere with the ultrasonic sounds bounced back, and beyond 70 days gestation, more practice is necessary to properly diagnose pregnancy. See Figure 3.

The place to check for pregnancy after 30 days is the right



The sound wave beam must pass through the uterus to detect pregnancy.

flank area, about 2 to 3 inches in front of the hind leg and just above the nipple line. The sound wave path is directional. The sound beam must pass through the uterus in order to detect pregnancy. Point the sound beam forward and toward the opposite side at about the last rib near the lateral tip of the loin muscle.

The sound wave beam penetrates the body wall, which has layers of fat and lean separated by connective tissue. Each layer reflects sound. When the beam passes through the pregnant uterus, nothing interferes with its passage. The instrument is programmed to detect this vacant spot. So a signal returning from the top of the fluid-filled uterus indicates pregnancy. See Figure 4. Once the sound beam hits the upper wall of uterine tissue, sound is again reflected back.

Some instruments give a visual display and others give lights or audio signals, or both.

Procedure:

- Apply adequate oil to the probe and place on indicated location and turn on instrument.
- Set gain ratio of output power to input to midpoint of *on* scale and rotate each way slightly until proper gain is determined.
- Only slight variation in gain is required from animal to animal.
- If no signal appears, apply more oil because good contact is required to get signals.

Most errors are made by diagnosing pregnant animals open. Some reasons may be:

- The uterine horn in gilts is usually smaller than in sows and

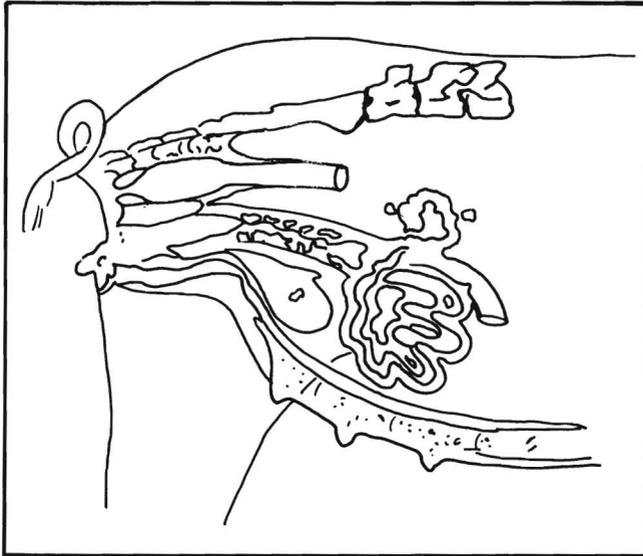


Figure 1. Pregnant less than 30 days or not pregnant.

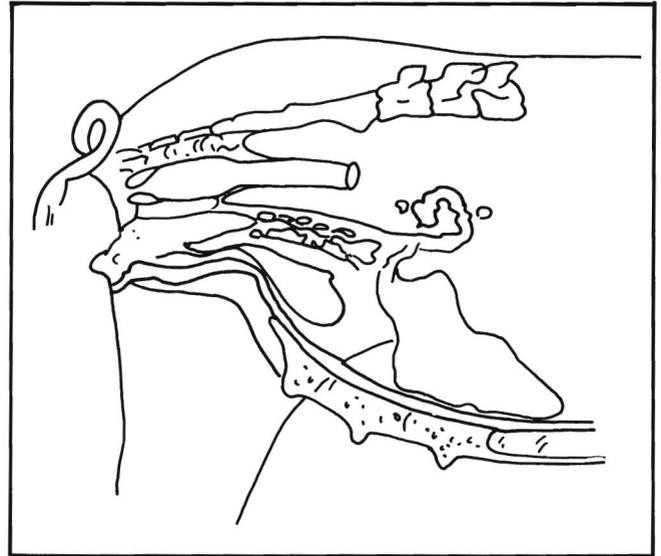


Figure 2. Pregnant about 35 days.

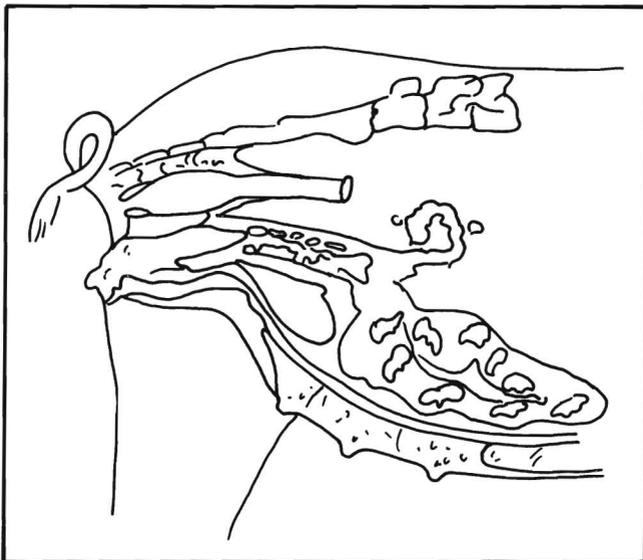


Figure 3. Late pregnancy, more than 80 days.

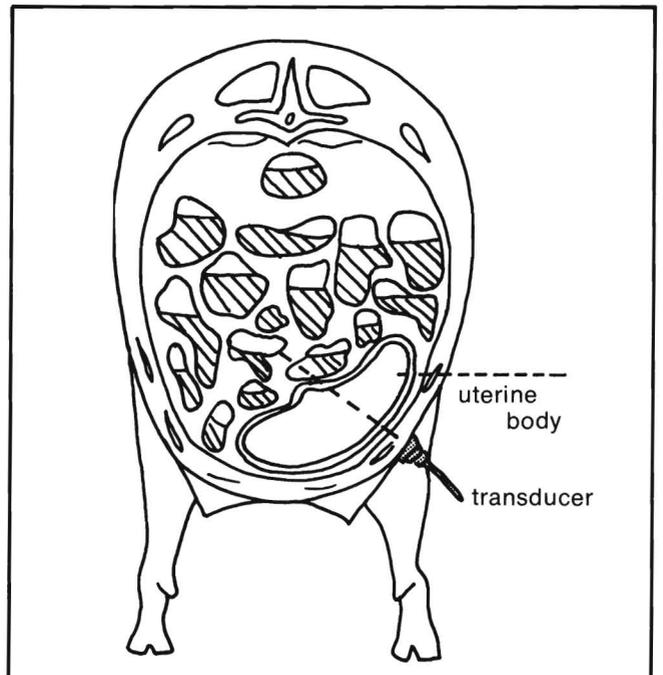


Figure 4. Pregnant more than 30 days.

drops later in gestation.

- Small litters cause the uterus to drop more slowly. Re-check 5 to 7 days later.
- The pregnant uterus may not lie as described, so move the transducer slowly to other areas close by.
- Occasionally the left uterine horn drops first, so check the left side if the right side indicates not pregnant.

Animals diagnosed open should be checked about 2 to 3 more times during the next 5 to 14 days. During this time, you should be able to diagnose the animal as open or pregnant.

Fake pregnancy diagnosis occurs occasionally. Some reasons and precautions are:

- Aiming the transducer beam backwards or straight up passes sound through the urinary bladder and results in the same diagnosis as pregnant.
- An extremely over-finished female with thick fat layers in

the flank area can give the same signal as a pregnant animal.

- Females in heat collect uterine fluids and may indicate pregnant. So check for heat before pregnancy checking.
- If the female shows open, do not search too long for pregnancy signals but re-check a few days later.

The detection of pregnancy as early as 25 days gestation may indicate a large litter size. Because of increased size, the uterus drops early. This is about the only indication of litter size.

An experienced operator can predict the stage of gestation, to a limited degree, with instruments having a visual screen display.