

PREGNANCY CONTROL IN COWS WITH THE ULTRASONIC TEST

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The economics of dairy cattle keeping depends among other things, mainly on fertility. The calving interval, which should be approximately one year, is significant in this context. Reliable and early detection of those animals which are not pregnant after mating is therefore of utmost importance, particularly since a large number of animals show no interest in mating afterwards.

Among the methods of early pregnancy detection in cattle is the rectal examination, which to this day is the procedure most often relied upon. It permits positive diagnosis as of the 8th week of pregnancy. Recently, the milk-progesterone determination, has found partial application in the early detection of non pregnant cows, (20 - 24 days after mating).

Increasingly, ultrasonic technology has been used in swine breeding for the purpose of early pregnancy detection. The first application of ultrasound was by the use of the Doppler effect, which senses movement (heartbeats, pulsing etc.). This did not enjoy wide use since it requires extensive training and freedom from noise during testing. In addition, it is slow. The use of a Doppler instrument is only mentioned in secondary literature on cattle keeping, by Fraser et al(1971) for 56 cows and Weiss (1975) for 24 cows. Only the former authors indicated that pregnancy verification is possible as of 4 months after mating.

Recently, the ultrasonic principle used for some time in the measurement of backfat thickness in swine, has been gaining increasing favor for pregnancy diagnosis in cattle. The ultrasonic waves emitted from the probe, are reflected from the interface between the uterus and the amniotic fluid, which is present in a pregnant cow. The reflection, called an "echo", is received by the same probe and translated into electronic signals, which are then displayed upon an oscilloscope tube, or converted into an audible tone, a light, or a combination of these, depending upon the brand of device used.

The successful application of this echo sounding process in swine breeding, suggested that its potential in dairy cattle should be investigated. To date, only Hansen (1979) reports any results in this respect. He conducted his test by applying the probe to the body surface of the abdomen of 8 Jersey cows, which were pregnant between the 30th and 90th day. Pregnancy could only be verified for 4 animals, which were pregnant from 61 to 90 days.

Our examinations were conducted in four agricultural operations, on 83 cows of the

German Black/White Type. The pregnancy status of the cows was not considered. Calved and not mated animals were also tested. The pregnancy test was conducted a total of 1,150 times. We used the portable ultrasound instrument, RENCO PREG-ALERT, which is 24 cm long X 21 cm wide X 8 cm and weighs 2.7kg complete. The design also provides for the measurement of backfat and loin depth. Pregnancy is registered by a signal on an oscilloscope screen and by an audible tone.

Cooking oil was used as a coupling medium to establish good contact between skin and probe. In the beginning of the testing we shaved the hair off at the test site, but this was later discontinued, (then, however, more coupling fluid had to be used).

All tests were carried out on the right side of the animals. According to Hansen (1979), the site for testing lies 0-7.5cm in front of, and 12-15cm below the top of the hip bone, with the probe being pointed towards the left leg. Pregnancy could not be verified on any of the animals at this site, even when it was known for certain that the animals were pregnant. Tests were subsequently conducted on other possible sites, (near hip bone, flank, in front of the right leg). All tests remained unsuccessful (800 prox.).

Test sites just in front of the udder, as those to the side of the udder, between knee-fold and udder, as well as between shank and the udder brought results, III. 1. 343 tests were conducted in this area. Table 1, offers an overview of the total result of pregnancy tests at the "udder" site. It can be seen that 88.3% of all cases had correct diagnosis; 11.7% of the tests led to a wrong diagnosis. If one differentiates between pregnant and not-pregnant animals however, it can be seen that in the former case significantly fewer correct diagnoses occurred, 84.2%, than in the latter cases (93.5%), in which calved and not mated animals were included.

As could be expected, due to the corresponding increase of fluid in the uterus, the share of correct diagnoses increases with the progress of pregnancy (Table 2). Pregnancy in the animals could be verified with 100% accuracy as of the 4th month of pregnancy. The only bothering aspect is that in 6.5% of the tests on the not pregnant animals, pregnancy was indicated incorrectly. However, repeated testing on specific animals, helps to avoid such incorrect conclusions.

In pregnancy checking with ultrasonics, one can never wholly discount the possibility that ultrasonic waves will hit the more or less filled bladder instead of the uterus, which could bring about wrong diagnosis. This danger is particularly likely in not pregnant cows or cows at the beginning of pregnancy, when the fetus is still in the vicinity of the bladder (III. 2). In addition, there is very little fluid in the uterus at this time. Ahlers et al (1979) indicates amniotic fluid amount of only 30-80 ml for the 4th - 5th week after conception, whereas the fluid amount can be as high as 2 l in the 11th - 14th week. III. 3, shows the extent to which the uterus grows up to this time and then drops towards the abdomen. This corresponds roughly to the stage after which, pregnancy can be verified without exception.

Pregnancy verification can be made earlier with rectal examination and with the help of the milk-progesterone test, than with the ultrasonic method. The extent to which an absolute pregnancy diagnosis can be made before the 4th month with the echo sounding process, requires further testing with a larger sample, together with shorter testing intervals. Finally, the possibility cannot be excluded, that perhaps another body site will be found, which permits earlier absolute diagnoses. Nevertheless, the described process has the advantage of making pregnancy determinations without laboratory examinations, directly on the animal, by those who are not veterinarians, and without danger to the mother or fetus. Even a positive early rectal examination or milk-progesterone determination, does not exclude the fact, that the cows may later abort. For this reason, it would be worth considering the ultrasonic test, as a supplemental method, to the two mentioned above, in a pregnancy management program.

Application of the RENCO PREG-ALERT instrument in small operations, will probably fail because of the price of the instrument -- 3,600DM prox. However, cooperative use of one instrument by several breeders should be considered, particularly since it can also be used for the measurement of fat and muscle in swine, and pregnancy detection in other types of animals, such as swine, horses, sheep and goats. Other alternatives might be considered in the application by milk control assistants, insemination technicians and others.

RENCO PREG-ALERT

TABLE 1 - DAIRY CATTLE

MONTHS AFTER INSEM.	NO. OF TESTED PREGNANT COWS	CORRECT DIAGNOSES		WRONG DIAGNOSES	
		NO.	%	NO.	%
1	14	6	42.9	8	57.1
2	24	12	50.0	12	50.0
3	29	19	65.5	10	34.5
4	20	20	100.	--	--
5 TH thru 10 TH month	10-30 EACH MONTH	ALL	100	--	--

TABLE 2 -- DAIRY CATTLE

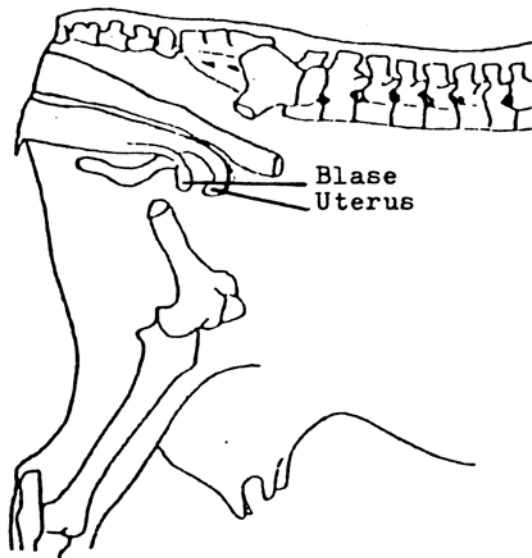
NUMBER OF TESTED COWS	343	100.0%
Diagnosed Correctly	303	88.3%
Diagnosed Wrongly	40	11.7%
PREGNANT COWS	190	100.0%
Classified Pregnant	160	88.3%
Classified Non-Pregnant	30	15.8%
NON-PREGNANT COWS	153	100.0%
Classified Non-Pregnant	143	93.5%
Classified Wrongly	10	6.5%

TABLE 3 - SHEEP

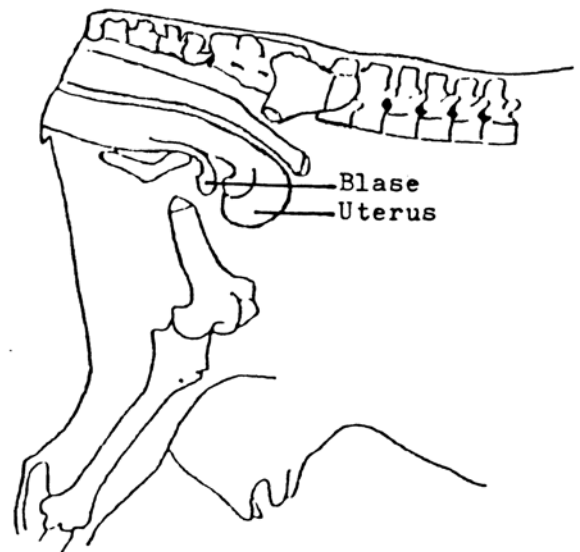
NUMBER OF SHEEP	58		100.0%
Diagnosed Correctly	56		96.6%
Diagnosed With Doubt	2		3.4%
PREGNANT SHEEP	47		100.0%
Classified Pregnant	45		95.8%
Classified With Doubt	2		4.2%
NON-PREGNANT SHEEP	11		100.0%
Classified Non-Pregnant	11		100.0%
DAYS OF PREGNANCY SHEEP	0-49	50-69	70-UP
Number	0	13	34
%	0	27.6	72.4



ILL. 1.



ILL. 2.



ILL. 3.