Fertilization and Embryo Loss (EED)

There is a difference in losses between fertilization and embryo loss. Various fertilization studies show that 85 to 95 % of the ova are fertilized in normal cows. In repeat-breeder animals fertilization rates are lower and vary between 56 and 72 per cent. Early embryo loss is a major determinant of reproductive wastage in cattle breeding, and accounts for about 25 per cent of failed conceptions. The loss occurs gradually between days 8 and 19 after breeding, with the result that animals return to estrus within a normal 3-week interval. Later embryo loss shows up as irregular return to estrus. Three studies done in the late 90's showed average losses between 30 and 150 days to be close to 10%. Ultrasoning for pregnancy around 27-30 days has shown a fetal loss of 10-15% as normal in most studies when rechecked at 60-70 days.
Palpation to check for pregnancy between 36 and 50 days may increase fetal loss also but most studies show at most 1-2% increase in loss compared to what there would be with no palpation.

Non Disease factors involved with embryonic death

EFFECT OF NUTRITION

Beta-carotene, selenium, phosphorus and copper deficiencies have all been implicated with increased incidences of embryo loss. However, because of the problems of establishing a direct cause and effect relationship between nutrition and fertility very few clear-cut conclusions can be made at this time.

CYTOGENETIC ABNORMALITIES

One report suggests an incidence of 8 per cent of abnormal chromosomes in 12- to 16-day old cattle embryos. There are extensive data from studies on humans suggesting that chromosomal aberrations account for 33 per cent of the lost conceptions that occur in early pregnancy.

IMMUNOLOGIC FACTORS

Antibodies produced against sperm and embryo antigens may reduce fertility. One study in pigs showed that adding leucocytes to sperm increased litter sizes.

UTERINE ENVIRONMENT

In the uterus there are critical time and steroid requirements, presumably for proper protein synthesis, which must be satisfied for normal development to proceed.. Transformation of the endometrium occurs in order to promote the correct uterine secretions for development of the embryo. These histologic transformations are under the control of progesterone and estradiol, and result in distinct patterns of low and high molecular weight substances being continually produced in the correct chronologic sequence. Total protein levels are higher and differences were found in phosphorus, zinc and calcium levels from the uterus of normal cows compared to repeat breeder cows. Cows that had retained placenta or cows losing body weight between 28 - 56 days were twice as likely for EED.

HORMONE LEVELS

Once conception has taken place, it is necessary that the corpus luteum of the cow be maintained for continual progesterone production for at least 8 months in order to maintain pregnancy. In nonpregnant cows the uterus secretes prostaglandin at 15-17 days of the cycle to get rid of the CL. Recent evidence suggests that the embryo exerts an opposite effect just prior to the time at which an increase in PGF production occurs in nonpregnant cows. Since the major proportion of embryo loss occurs prior to day 18 of the estrous cycle, it is questionable if embryo

loss prior to day 15 is from a wrong or inadequate signal from the embryo between days 15 and 17. Most studies show that there is insignificant differences in progesterone levels between pregnant and nonpregnant cows by day 17 , however there would appear to be some indication that in repeat-breeder cows administration of progesterone tends to increase the pregnancy rate. By using human chorionic gonadatrophin (hcg) at day seven we can raise blood levels of progesterone by getting the CL to stimulate production and also by getting the formation of accessory Cls which produce even more progesterone.

TIME OF ARTIFICIAL INSEMINATION

The fertile life span of the cow ovum is about 6-8 hours and 18 to 24 hours for spermatozoa, depending on whether they have been frozen, the nature of the diluent and the method of storage used. If ovulation occurs around 27 hrs.(from the start of standing heat),the sperm cells must get to the ovum within that 6-8 hr. window. When aged sperm or ova are involved in the fertilization process, the resultant embryo often dies prematurely.

At present there are no clear-cut recommendations or hormonal preparations that can reduce the extent of this early embryo loss. The best recommendation is to ensure that cows are bred at the optimum time to bulls of high fertility or with highly fertile and adequate numbers of properly preserved spermatozoa.