What is current status of genetic technology?

FORT COLLINS, Colo. — Cattlemen and dairymen these days are speaking a new language.

Today there is talk of genetic engineering, embryo transfer, embryo splitting, cloning, selective sexing, and in vitro (test tube) fertilization.

Within the past few years significant developments have brought a wave of new technology to the cattle and dairy industry. Freezing of embryos has become an economic proposition. A technique for splitting embryos has been developed. Embryo sex determination is making advances. The introduction of a new estrus synchronization product promises to aid the practice of embryo transfer at the producer level, and it has brought renewed interest in artificial insemination by making A.I. more practical for beef and dairy producers.

Putting all these developments together, experts foresee a revolution in the production of beef and milk in the next decade.

"State of the Art"

What is the current "state of the art" in cattle breeding?

According to experts testifying before a Congressional subcommittee, current cattle breeding technology is somewhere "in the middle" — not yet close to the cloning of a super animal, but yet a lot more advanced than many realize.

Dr. Peter Elsden, manager of the Embryo Transfer Unit at Colorado State University, states that embryo transfer already is "well out of the lab."

Embryo transfers, according to Dr. Elsden, are occurring at a rapidly-increasing rate. Dr. Elsden cites figures showing that approximately 10 years ago breed societies registered 20 cows from embryo transfer, and now the number is well over 100,000.

Another indication of the growth of this practice is the announcement of a scheduled transfer of 300 frozen cattle embryos from the U.S. to recipient cows in Venezuela, one of the biggest such experiments to date.

Rapid Genetic Progress

Dr. Elsden states that embryo transfer will increase the rate of genetic improvement in herds, first for the registered breeder but later for the commercial man as more high-quality animals become available for sale. And, there will be more rapid test progress at the experimental research level.

Describing the transfer procedure, Dr. Elsden explains that a genetically-superior animal is treated with stimulant hormones to induce growth of many follicles, resulting in the release of more than one egg at ovulation, perhaps 5 to 25 or more. The donor animal is then bred A.I. to a selected superior sire. Several days later the embryos are non-surgically collected. The embryos are then non-surgically (or surgically) transferred into recipient animals, who carry the embryos through gestation.

Embryo transfer is a means to an end, says Dr. Elsden. There is much greater utilization of selected females. It is a deliberate matching of selected superior sires to superior females, thus producing many more calves from those superior females. Using embryo transfer, a female with known superior beef or dairy characteristics can produce far more offspring than the usual one calf per year.

Role of "Synchronization"

The producer-level use of embryo transfer has been complicated by the problem of "synchronization." Without preserving embryos, the producer must synchronize the estrus cycle of the donor animal and the recipient animal. They must be at the same stage of their heat cycle. When embryos are collected, there must be an adequate number of synchronized recipients for implantation.

Dr. Peter Elsden, Colorado State

A recent development in this respect is the introduction of a new estrus synchronization product by CEVA Laboratories, Inc.

Synchre-Mate-B, FDA-approved for use in cycling beef and dairy heifers, has led to renewed interest in artificial insemination and genetic herd improvement.

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