

## **Embryo Transfer Technology**

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**Animal Breeding Group, NDDDB, Anand**

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Embryo Transfer Technology (ETT) is a technique used to increase the reproduction rate of cows and buffaloes. Theoretically, a cow/ a buffalo can produce one calf a year that makes its reproductive rate lower. Every 21 days it comes into heat and releases one egg (ovum). If the animal is mated to a bull at the right time during the heat or inseminated artificially, the egg is fertilized which results into a pregnancy. The animal would deliver a calf after about 280 days of gestation in cows and 310 days in buffaloes.

Due to low reproduction rate, the genetic contribution of cows to next generation was minimal. However, the bull at the same time (one year) can make about 10000 cows pregnant and thus contributes its genes to large number of animals in future population.

However, with ET, now a cow can produce 5-10 calves in a year. Embryo transfer simply means collection of an embryo from a donor female and its transfer to the uterus of a recipient female of the same species. For a successful transfer it is essential that the embryo should be of transferable quality and at the Stage of “compact morula” or “blastocyst”), the estrus cycles of both donor and recipient females be properly synchronized, and both collection and transfer procedures are carried out in most hygienic environment without even slightest injury to genitalia of either donor or recipient. All these requirements make the technique a difficult one to be propagated under village conditions.

Theoretically, an embryo can be collected from a cow every 35-40 days i.e. about 10 embryos in a year. However, scientists now have evolved methods for stimulating the ovaries of a cow to produce many eggs in a cycle by injecting FSH hormone. This process is known as Superovulation. Presently average transferable embryo recovery per

superovulation is about 4-5 embryos in cows and 2-3 in buffaloes. Embryos are collected 6-7 days post heat. These embryos are evaluated for the quality and then are either frozen and preserved for future use or transferred fresh to synchronized recipients. Embryos that does not qualify the quality evaluation are discarded.

The ET calves have genetic quality of their donor mother. The recipient cows only act as surrogate mothers, which carry the embryo to its full term.

ET is not a treatment for infertility. For ET to be successful, both donor and recipient animals need to be reproductively healthy, non-pregnant and in positive energy balance as far as feeding is concerned. It is worth mentioning here that ETT is not a routine breeding tool and cannot replace field artificial insemination.

Embryo collection and transfer are highly skilled jobs to be performed only by trained veterinarians. Embryo transfer also requires a sophisticated laboratory, equipment, consumables and biologicals, majority of which are not available in the country and need to be imported. Therefore, it is quite expensive and cost of embryo depends on embryo recovery rates besides the material cost. Embryos should only be collected from elite donor females whose production is well above the production of the population and are free from any diseases. ETT is extensively used for production breeding bulls in many parts of the developed world.

Field embryo transfer work can be conducted using fresh or frozen embryos. In case of fresh transfers, flushing (embryo recovery) of donors have to be planned and carried out in the field itself or close to the place of actual embryo transfer. This gives better pregnancy rate. Frozen (either in Glycerol or in Ethylene Glycol) embryo transfer can also be taken up in the field. This gives slightly lower pregnancy rate than achieved in fresh embryo transfer. It is much easier to transfer embryos

frozen in Ethylene Glycol because this does not require multi-step thawing of frozen embryos.

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*Prepared by Dr M Namjoshi, NDDB, Anand*

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