USE OF INDIGENOUS BREEDS OF CATTLE AND THEIR CROSSES IN UGANDA AS RECIPIENTS FOR IMPORTED BOS TAURUS EMBRYOS

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SUMMARY

In July 1991, 29 frozen imported Holstein Friesian embryos were transferred into synchronised recipients in Uganda. Recipient cows and heifers from indigenous breeds of cattle and their crosses in Uganda were used. The project resulted in 17 pregnancies confirmed by rectal palpation at 8 weeks. Twelve live calves were born of which 7 were heifers and 5 were bulls. One heifer calf died at one month of age from East Coast fever. One pregnant recipient died of East Coast fever 2 months before calving. Two recipients aborted in late gestation as a result of trauma incurred during fighting. Two calves were lost as a result of dystocia. The transfer work and calvings were performed at 3 different farms under varying conditions. The 11 surviving animals are being reared on a single unit where growth rates and performance data are being recorded.

INTRODUCTION

There is an urgent need in Uganda to increase cattle numbers following their decline during the political instability of recent times. In response to this need live Holstein Friesian cows have been exported from Britain. These cows have been successfully managed individually by Ugandan family recipients.

As a result of the success of this programme, embryo transfer was considered as a means of importing Holstein/Friesian genetics more cheaply and to greater advantage in terms of acclimatisation of animals. Consequently this small pilot project was launched.

The survival of European dairy breeds and their crosses with zebus in the tropics has been reviewed by Pearson de Vaccaro (1990). It is reported that mortality rates are unacceptably high and as a result neither imported or locally born European dairy animals are able to generate sufficient replacements to maintain their numbers. The deficit is especially marked in the case of imported dams. As a consequence of this a number of tropical countries have reverted to continuous importation to maintain their European cattle populations.

Sreenan (1988) reports that the costs associated with the international movement of cattle are so great that they seriously limit movement except when the financial value of the animals is very high. However, the efficiency of embryo freezing and storage is now such that there has been a rapid increase in the international movement of cattle embryos.

Mahon and Rawle (1987) report on the export of deep frozen bovine embryos to 19 projects in 7 developing countries including their own experiences in 5 of the countries concerned. It is reported that the animal introduced as an embryo will adapt better to its environment. It will receive passive immunity to the local diseases from
its recipient dam, and its immune system will develop in the appropriate surround-
nings. In addition, the animal will grow and develop in the new environment and
will be acclimatised from birth to any climatic stresses.

In view of the potential advantages of embryo transfer in terms of reduced trans-
portation costs and increased adaptability of the embryo calves to the tropical
environment, it would seem logical to replace live animal exports with embryo
exports. However, generally this has not happened in cattle breeding programmes
in the tropics despite the obvious advantages. It was the objective of this project to
review embryo transfer procedures connected with the export of *Bos taurus* genes
to the tropics and develop a successful protocol to act as a model for further work.

**MATERIALS AND METHODS**

**Non surgical recovery of embryos**

The methods used were as described by Newcombe (1981) with a single modifica-
tion. Instead of recovering flushing fluids into a sterile graduated glass collection
cylinder a sterile collecting filter (Emcon USA) was used instead.

**Identification and classification of embryos**

Searching for embryos was performed in a mobile heated laboratory using a Wild
M5 stereomicroscope. Viable embryos were classified as follows:-

- **Grade 1**: No, or minimal, visibly detectable dead embryonic material.
- **Grade 2**: Small amounts of visibly detectable dead or degenerate embryonic
  material present.
- **Grade 3**: Large amounts of visibly detectable dead or degenerate embryonic
  material present associated with a reduced but distinct mass of normal
  healthy embryonic cells.

All viable embryos were between 6½ to 7½ days old. Only grade one viable embryos
were frozen for this project.

**Freezing of embryos**

Embryos were frozen using the following procedures:-

a) Each embryo was washed a total of 10 times, each time in a clean solution of ovum
   culture medium (OCM, Flow Laboratories).

b) After washing, the embryos were glycerolised by immersing firstly in a solution of
   5% glycerol in OCM for 10 min before transferring into 10% glycerol in OCM, the
   final freezing solution. Glycerol was used as the cryoprotectant.

c) Each embryo was then transferred into a separate glass ampoule containing 1 ml of
   freezing solution. Each ampoule was heat sealed in a bunsen flame.

d) The ampoules were then all transferred into a Planer R206 programmable embryo
   freezer and frozen according to the following programme:-

   a) Room temperature to −7°C at a rate of descent of 1°C per min.

   b) All ampoules were “seeded” at −7°C i.e. ice crystal formation was induced in
      the freezing solution by immersing forceps in liquid nitrogen and then applying
      them to the side of the sample.

   c) −7°C to −23°C at −0.3°C per min.

   d) −34°C to −37°C at −0.1°C per min.

   The machine automatically held the temperature at −37°C.

   The ampoules were then removed from the freezer and plunged immediately into
   liquid nitrogen at −196°C where they were stored pending export. A more detailed