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Artificial Insemination and Embryo Transfer Techniques

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ABSTRACT

The modern techniques of Artificial Insemination (AI) and Embryo Transfer (ET) are briefly outlined. Their application in rapid development of livestock industry in Papua New Guinea is discussed.

INTRODUCTION

The rapid development of cattle industries in the United States, Europe, Australia and New Zealand in the 20th century has in no small measure been due to the development and mastery of two modern techniques *viz.* Artificial Insemination (AI) and Embryo Transfer (ET). Of these much has been said and written about AI while ET is a comparatively recent development. Both these techniques have been used for the development and dissemination of high performance breeding cattle in the industrialized countries and have considerable potential in the developing countries

ARTIFICIAL INSEMINATION (AI)

The use of frozen semen in impregnating cattle in the developed countries has reduced the need of having herds of bulls for servicing the cows. This technique has important applications in the rapid development of cattle industries in developing countries. This is because it allows the transfer of the correct and required type of germplasm from other parts of the world without the necessity of costly transport of commercial herds and nucleus herds over long distances.

But most developing countries have been unable to establish and maintain an efficient AI service. The only exceptions to this statement are India and China. It is necessary to have AI services on which cattle breeders feel they can rely on. In Papua New Guinea (PNG) AI has been introduced by Ramu Sugar Ltd on its cattle ranches but there have been continued setbacks. It seems that intensive training of personnel and back up veterinary support services are a prerequisite for the maintenance of reliable AI services.

EMBRYO TRANSFER (ET)

In this technique seven day-old embryos are collected from the uterus of a donor cow. The embryos are then transferred individually to the uteri of recipient cows. These cows act as surrogate mothers and give birth to calves. For maximum performance the donor cow is super-ovulated by giving follicle - stimulating hormone for three days. This way such cows can release up to twenty (20) ova. Using AI or natural mating the ova are fertilized. After seven days the ova are ready for collection and further processing. With ET a cow can now produce an average of 15 calves per year. This technique is yet to be introduced in PNG.

ADVANTAGES OF AI AND ET

1. A major advantage of ET technique when combined with AI is that there is no need to import cattle with possible new diseases or undesirable traits that they may be carrying.

2. AI and ET can be used to improve local cattle herds by transferring germplasm of high quality breeds from the outside sources.

3. AI and ET are the best ways of importing cattle without them actually leaving the exporting countries. Breeding material in the form of frozen embryos is currently being exported from EEC to several third world countries.

CONCLUSION

The use of ET technology has, in the last five years, gained momentum for research on cattle productivity, resistance to pests and diseases and vaccine development. Some of these studies require sets of

identical twins which can be produced by bisecting an embryo prior to implantation in recipient cows. AI & ET are now time tested and established techniques for accelerated cattle development in developing countries. It is up to their administrators to apply these tools to meet the ever increasing protein requirements of their people. By importing superior genetic material from North America, European breeders have developed high performance cattle breeds. Such programmes are sorely required for countries such as Papua New Guinea if they want to cut down their huge beef import bills.

FURTHER READING

Meyn, K. (1991). The contribution of European cattle breeding to cattle production in the third world. *Animal Research and Development.* 34: 89-99. ❑