

**THE ROLE OF BIOTECHNOLOGY FOR BREEDING PROGRESS  
AND DEVELOPMENT OF LIVESTOCK PRODUCTION  
IN VIEW OF FOOD SECURITY**

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**Abstract**

*Despite progress in agriculture, an estimated 826 million people, or about 13% of world population, still suffer from hunger. Scientific research in biotechnology and their applications in agricultural practice have fully demonstrated the mutual and indissoluble link between reproduction and livestock production in terms of growth and leadership on fertility, birth rate and prolificacy animals, which directly affect people's quality of life through ever-increasing needs animal protein. Biotechnologies for use in all animal species, but they are unevenly supported. The most advanced application of AI and ET progress was made in cattle on which the species has reached perfection and ET has been applied widely in animals with high genetic value, according to official data from ANARZ and ARET. A special importance should be given to the veterinary supervision of animal health, livestock production processing properly obtained, for health and safety of consumers in ways that allow sampling of the whole technological chain from farm to plate the food in , thus reconstructing the traceability of raw materials to the farm animals.*

**Keys Words:** biotechnology, animal production, food security

**INTRODUCTION**

Despite progress in agriculture, an estimated 826 million people, or about 13% of world population, still suffer from hunger. Scientific research in biotechnology and their applications in agricultural practice have fully demonstrated the mutual and indissoluble link between reproduction and livestock production in terms of growth and leadership on fertility, birth rate and prolificacy animals, which directly affect people's quality of life through ever-increasing needs animal protein.

Progress in breeding was possible from intimate knowledge of breeding phenomena. Animal reproduction has many biological, technological and economic, which directly affect the quantity and quality of livestock production.

Biotechnology of Reproduction provides an outstanding contribution by its theoretical and practical content to enhance learning and improve the quality of modern livestock herds, high yield and economic efficiency, Bogdan AT,( 2002). The quantity and especially the production of semen quality is a primary means of intensive biotechnological breeding. The fertility of a breeding is strictly related to semen quality. I cannot ignore the economic

benefits of applying some of the methods to increase production of milk, eggs, wool, animal weight gain, reducing non-productive period, introducing a series of disease resistance..Most geneticists are optimistic thoughts already turning to the creation of cloned transgenic cattle herds, the milk which they find extremely abundant medicinal interest. Animal reproductive technologies have the potentiality to develop a wide variety of new varieties on the one hand, and on the other hand can increase productivity in animal husbandry. Some have gone even biotech animal to human, which can lead to progress, but in many cases, however, appeared more and more ethical issues. Therefore access to certain such techniques should be limited so as not to trigger further changes difficult to overcome for the human species.

## **MATERIAL AND METHOD**

Worldwide breeding using biotechnology for the advancement and development of livestock production.

The main breeding biotechnologies that are currently used: artificial insemination and embryo transfer.

Artificial insemination is a breeding system that suppresses human sexual contact between female and male directly, allowing this division of sperm production and hence amplifies the number of offspring that can be obtained from a male.

Technical components of this technology are: the semen collection, processing and portioning dilution of the dose, its conservation (if possible by freezing) and inoculated to females in oestrus.

In terms of livestock artificial insemination application has the following advantages: the major objective is the practice of artificial insemination and genetic improvement of the working population through intensive and rational use of high-value livestock breeding male on a female actually huge compared to what can be included by using the respective breeding mating: estimating the livestock breeding is done by a complex of criteria on which grants partial class reliability; reduction in the number of bulls used for breeding, triggers the application of rigorous selection, as their genetic capability. To this end, both globally and in our country, the assessment method is bulls "Progeny-test (after progeny testing), was admitted to breeding only those who proved to be good breeders, thus ensuring genetic progress from one generation to another (better vertical); frozen semen offers international exchange of genetic values, access to global performance in the field, enabling companies specializing in the field with remarkable effects in several countries with advanced animal husbandry, including the stands in Germany, USA, Austria, France and others; . implications should also be noted beneficial in protecting and maintaining

the health of staff, having direct contact with the female male, avoid the dissemination of diseases through the first act of copulation (brucellosis, vibriosis, Trichomoniasis, etc.); artificial insemination (AI) entails enhancing male fertility, which allows increasing the intensity and accuracy of their selection and, ultimately, increasing pressure by the male in the work of genetic improvement.

Embryo transfer (ET) is the technology of breeding that pregnancy is obtained from the embryo recipient female foreign eggs or embryos to be transferred. Technical components of this biotechnology are: selection of embryo donor females, for their stimulating hormone polioovulation monotocic species and species politocic ovulation, fertilization of ova in oviducts obtained maternal, embryo collection formed 7-8 days after mating or AI before implementing them in the womb and their transfer to recipient females synchronized with the phase of cyclical uterine age at which embryos were collected (fresh or after preservation by freezing), G.F. Toba (2000). Embryo is a biotechnology that pair formation is controlled by man and is also known as IA

## RESULTS AND DISCUSSION

Although these biotechnologies are used in all animal species are unevenly promoted them. The most advanced progress made in applying AI to AI in cattle species that has reached perfection.

The collected data and processed by the National Livestock Breeding and Reproduction in (ANARZ) at national wide IA dynamics in farm animals in the period 2000-2008 is show in figure nr. 1.

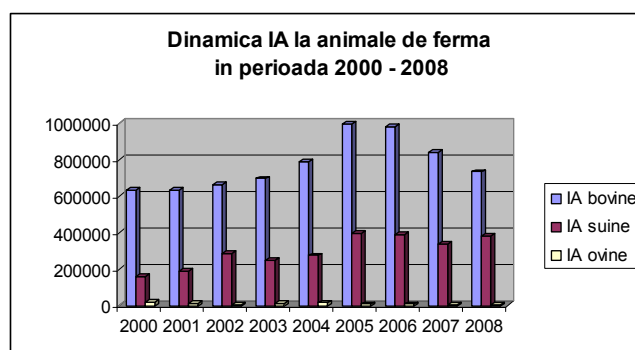


Fig.1 Dynamic AI in farm animals in 2000-2008

In figure no.1 it appears that the largest number of national IA was recorded in 2005 at 992 010 cattle (58.15%) of total montings, the largest swine species number was recorded in IA 2006 388 710 (30.55%) from

sheep and goats the highest number of AI was recorded in 2004 by 15,717 (25.14%)

In cattle, species monotocic that rule is that the estrous cycle to open a single mature follicle, ovulation last development takes place in the practice of multiple donors became Moet ET published data after the European Association for Embryo Transfer (AETE ) and processed L.G. Tobă (2010), situation embryo transfers during 2000-2009, at wide Europe is shown in figure 2.

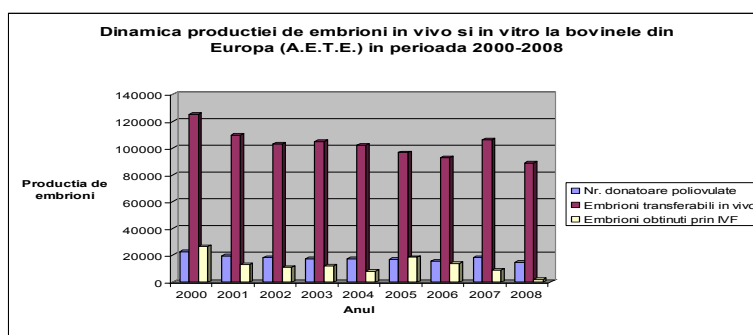


Fig.2 The dynamic of in vivo and in vitro embryo production in bovines from Europe (AETE) between 2000-2008

From Figure no.2 central dynamic is apparent in the number of donor poliovulate since 2000, was 22,723 of which were transferable embryos produced approximately 125,005 (5.5 E / D) and 26 520 IVF embryos of production European level dropped continuously, reaching in 2008 the number of donor-poliovulate be 14,824 and the number of transferable embryos to be about 88,858 (5.97 E / D) and embryos obtained from IVF to fall to 7832. Romanian Association of EmbryoTransfer (ARET) has been accepted that association on September 12, 1995 and 1996 reports of transfers of embryos are made by the three teams allowed. This situation results in figure no.3.

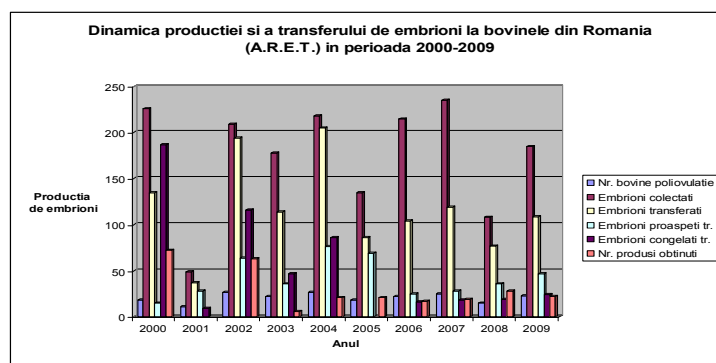


Fig.3 The dynamic of embryo production and transfer in bovines from Romania (ARET) between 2000-2009

In fig. 3. can be observed dynamics embryo production and transfer in cattle in Romania. In the period 2000-2009 can be seen that there were 208 cattle poliovalate donor, from which 1758 were taken from embryonic formation (8.45 / D), which potentially transferable embryos 1180 (67%) were transferred to national wide 831 embryos (429 and 402 fresh embryos, frozen embryos), after which 269 resulted gestation (32%).

The MOET is pressed to have more ovulations, not only by hormonal stimulation of maturation of ovarian follicles to increase the number of follicles dehiscence but also to reduce the interval between samples (washing) the success of embryos from the same donor, Paraschivescu M.Th. ( 2008, 2010). The more daring research has led to the induction and stimulation obtained immediately after lyses poliovation lutea formed in place of follicles from which eggs and embryos collected later. Initially it was considered that the ET in cattle after poliovation and especially the one after multiple ovulations, the donor cows would increase the intensity of selection, as selection intensity increased IA male genitors. It was found that raising the fertility of cows but also through the practice of MOET, is much weaker than the increase in fertility bulls gained IA. ET is a superior breeding IA in case of transfer of populations from one area to another because it eliminates the need to increase the absorption cross-checking required when using AI. When the transfer of a population is by IA participation by one parent, the replacement of blood is absorption cross over 5-6 generations. The transfer of a population by using ET is lower and it is comparable to that provided by additional imports of requiring only a period of 24-30 months as necessary for embryo inoculation and increased until puberty and installation heifers' pregnancy. This time, however, cannot be considered a waste of time because the incubation of embryos in the uterus of females belonging to the farm is transferred, use colostrums from

mothers who have formed antibodies to the living environment of the new born calves were obtained and formation of antibodies to themselves in advance for this environment will favor organisms transferred accommodate increasing their chance of acclimatization. In other animal species practice AI and ET is less advanced than in cattle there are differences in this regard, and among other species.

Thus the pig is used widely IA (Mariana Sandu, St. Mantua, 2008), while the practice of ET is difficult because of anatomic and physiological peculiarities (St. Matthew, Mariana Sandu, 2008). Species are natural poliovulation politocic has so supraovulation follicle stimulating, not shown too much interest. Then freezing embryos has proved difficult. Success frozen pig embryos has been reported only by Polge, who used a particular technique for processing of embryos.

In sheep AI difficulty because the heat is very difficult to detect with high labor consumption.. For this reason it relies on the development of "IA blind in oestrus induced by hormonal treatment.. ET would be of more interest, but still used in various experiments.

The horses are AI and ET breeding biotechnology scientists' attention is because the commercial value of individuals within populations. In these species succeeded frozen semen. Some successes are reported on ET.

A special importance should be given to the veterinary supervision of animal health, livestock production processing properly obtained, for health and consumer safety. For this purpose new methods are used, fast and complex, like TypiFix A method of DNA isolation, the Prof.G.Brem, Ipate Iudith,(2009, 2010). This method enables us to monitor the health of thousands of animals in the detection of prions diseases, the BVD, etc and we also sampled the whole technological chain from farm to food on your plate, thus reconstructing the traceability of raw materials to the farm animals.

## CONCLUSIONS

1. Biotechnologies for use in all animal species, but they are unevenly supported. The most advanced application of AI and ET progress was made in cattle on which the species has reached perfection and ET has been applied widely in animals with high genetic value, according to official data from ANARZ and ARET.
2. A special importance should be given to the veterinary supervision of animal health, livestock production processing properly obtained, for health and safety of consumers in ways that allow sampling of the whole technological chain from farm to plate the food in , thus reconstructing the traceability of raw materials to the farm animals.

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