CURRENT STATUS OF LIVESTOCK REPRODUCTION AND THE USE OF ADVANCED REPRODUCTIVE BIOTECHNOLOGIES IN ECUADOR

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ABSTRACT

Ecuador is an agricultural country that underpins much of its economy on agriculture activities and 40% of its household population depends on them. Of the rural households, 84% of them own livestock, averaging 2.8 heads per household. It is estimated that there are 5 million heads of cattle and 5 thousand heads of water buffaloes in Ecuador. Around the country, we can find crossbred heifers resulted from crosses of introduced animals adapted through the years to the Ecuadorian environmental conditions. Good dairy animals for milk and meat production were identified but the absence of concrete breeding program limits the propagation. To improve the animals, the technique of artificial insemination had been implemented, using both fresh and frozen semen with a pregnancy efficiency of 60 to 70%. In Ecuador, few companies have focused on genetic improvement, although there are some, which have initiated the use of biotechnological tools such as multiple ovulation and in vitro fertilization and embryo transfer of genetically superior animals. The average of milk production is recorded in 8 to10 liters per day, but there are animals that can produce up to 40 liters, depending on genetics and field handling of animals. Today the Ecuadorian government has made efforts to improve milk and meat production by importing genetically superior animals to provide the farmers, as a means to increase and improve the livestock production in the country. There are also private companies that are dedicated to the selection and sale of genetically advanced cattle sires raised in Ecuadorian farms and adapted to our regions, such as Holstein, Brown Swiss, Jersey, Pizan, Dairy Gyr, Gir, Holando, Charolais, Hereford and Norman. The application of advanced reproductive biotechnologies is still at its infancy and requires technical enhancement in order to facilitate the development and nationwide implementation.

INTRODUCTION

Overview of Livestock Production in Ecuador

FAO (2015) mentions that farming is the main source of income of more than 200 million families of small producers in Asia, Africa and Latin America, and is the only source of livelihood for at least 20 million families. Latin America and the Caribbean produce more than 23% of beef and buffalo meat, and 21.40% of poultry meat in the world. In the case of eggs and milk, the participation of the region is more than 10% by weight and 11.2%, respectively. Ecuador is an agricultural country that underpins much of its economy on agricultural activities which have about 40% of its population; however, 84% of rural households own livestock, averaging 2.8 per household heads. It is estimated that there are 5 million heads of cattle in Ecuador, with an average of 298,000 farmers.

There are pastoral areas that have crossbred heifers resulted from crosses of introduced animals and those have adapted to the specific regions of the Ecuadorian environmental conditions through the years. As a result, it is found that there are good dairy animals for milk and meat production, even if they are not genetically
superior. Furthermore, it is also found that increase of the production depends not only on the herd but also on the efficient management in the use of grasslands, which can increase milk production by 30%.

On the other hand, there is very little information about buffaloes in Ecuador. The first importation was made from Trinidad in the 1980s and like in other countries they use the buffalo only as a labor animal. A herd of approximately one thousand buffaloes is at the hands of no more than five breeders, thus giving very few possibilities to study about its virtues. The breeders operate at present as much for milk as for meat and have shown interest in improving the herd, trying to acquire animals from Colombia and semen from Brazil, with not very good results, due to the sanitary controls of the different countries. There are buffalo farms, having around 500 heads of buffaloes with only one bull. A programmed breeding for each batch of females was adopted. Keeping more bulls in the farm is not effective because of the bulls to fight with each other.

Therefore, the buffaloes in Ecuador have not shown, to date, a great repopulation of their herd. It can be said that Ecuador is at the primary stage of buffalo industry development for which, fortunately, it can count on the integration and sense of cooperation offered at world level by the buffalo breeding countries like the Philippines.

Livestock Population

Livestock accounts for about 40% of Ecuador agricultural value added, and about 8% of GDP, and over the last five years has been the fastest growing sub-sector in agriculture. Livestock production is widespread throughout the country. Poor livestock keepers mainly raise cattle, sheep, goats, pigs and chickens. A distinctive characteristic, typically for the region, is the general predominance of dual-purpose livestock production over specialized beef and dairy production systems. Below is the population of livestock in Ecuador.

Table 1. Livestock population in Ecuador. Expressed in 1,000 heads

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<tbody>
<tr>
<td>Cattle</td>
<td>3,005</td>
<td>4,359</td>
<td>4,486</td>
<td>4,794</td>
<td>3.8</td>
<td>0.3</td>
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<tr>
<td>Sheep and goats</td>
<td>1,354</td>
<td>1,730</td>
<td>2,505</td>
<td>2,759</td>
<td>2.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Pigs</td>
<td>3,549</td>
<td>2,220</td>
<td>2,721</td>
<td>2,959</td>
<td>-4.6</td>
<td>2.1</td>
</tr>
<tr>
<td>Poultry</td>
<td>32,799</td>
<td>51,391</td>
<td>136,212</td>
<td>143,230</td>
<td>4.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Total LUs</td>
<td>3,454</td>
<td>4,293</td>
<td>5,433</td>
<td>5,804</td>
<td>2.2</td>
<td>2.4</td>
</tr>
</tbody>
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LU: Livestock Unit; conversion factors: cattle (.70), sheep and goats (0.10), pigs (0.25) and poultry (0.01)

Source: FAO (2005)

In the last decades, livestock has been one of the fastest growing sectors in the economy. Increased number of animals rather than increased productivity contributed to output growth, except for pigs. Productivity, as defined by carcass/weight, is similar to developing countries’ average, but below that of developed countries (Fig. 1).

Despite of the recent economic recession, demand for livestock products, particularly for milk and poultry, has steadily increased in the last dozen years. Between 1990 and 2001, meat and milk consumption increased in aggregate by 108 and 39% and by 66 and 11% in per-capita terms. Expected growth in population and per-capita income are likely to fuel further increases in meat demand (Fig. 2). Thus, a need for genetic improvement of livestock animals will be increased.
Figure 1. Trends in annual per capita production of meat, milk and eggs in Ecuador
Source: FAO 2005

Figure 2. Trends in annual per capita consumption of meat, milk and eggs in Ecuador.
Source: FAO 2005
SEmen Production and Artificial Insemination

In Ecuador, fresh semen is minimal for use in artificial insemination. Most of semen comes from other countries like the United States, Brazil and Canada. The ABS of the United States is usually the source of frozen semen. The quantities imported are not well known, since private companies carry out this activity. The use of semen in artificial insemination has an efficiency of 60 to 70% pregnancy rates and is performed by contracting technicians. Current effort is exerted to further improve the efficiencies by means of performing studies that may increase the accuracy of estrus detection.

Embryo Transfer and Other Reproductive Biotechnology

In Ecuador, there are few companies that focus on genetic improvement of cattle where they use biotechnological tools such as multiple ovulation and embryo transfer in their breeding program. Big haciendas are the main target of these companies. Attempt for in vitro fertilization (IVF) of genetically superior animals was also initiated but reports on the development were not presented. There are companies that keep the information as secrets without transfer to livestock producers, who at the moment do not handle this type of technology, facing the low production of meat and milk.

That's why it is necessary to implement more efficient biotechnological techniques, under government initiatives, to improve the genetics or spreading highly productive animals adapted in the region to increase the income of farmers. The technique of IVF is used worldwide and is helping the breeding of the species. Herradón (2007) mentions that numerous efforts to improve the efficiency of IVF, continues doing poorly, estimating a rate of 30 to 40% of oocytes capable of becoming transferable embryos.

Dairy Breeds Production

In Ecuador, the average of milk production is recorded in 8 to 10 liters per day, but there are animals that can produce up to 40 liters per day, this depends on genetics and management given to the animals. Recently, attention has been given to improve milk production; the Ecuadorian government has imported animals of superior genetics to give the farmers, as a means to raise production of meat and milk in the country. There are also private companies that are dedicated to the selection and sale of genetically advanced cattle sires collected in Ecuadorian farms, adapted to our regions, such as Holstein, Brown Swiss, Jersey, Pizan, Dairy Gyr, Gir -Holando, Charolais, Hereford and Norman (Biogensa, 2014). Those animals were introduced in the past to Ecuador from USA, Canada, Brazil, etc.

REFERENCES


